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Description and rules for the management of the U.S. ...

United States. Army. Ordnance Dept

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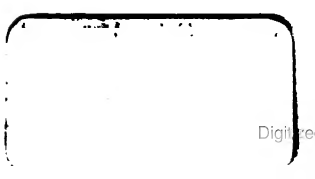

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No. 1923

DESCRIPTION AND RULES FOR THE MANAGEMENT OF THE

U. S. MAGAZINE RIFLE

MODEL OF 1903, CALIBER .30

(3 PLATES)

MARCH 3, 1904
REVISED APRIL 18, 1906
REVISED FEBRUARY 14, 1908

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Fig. 1.

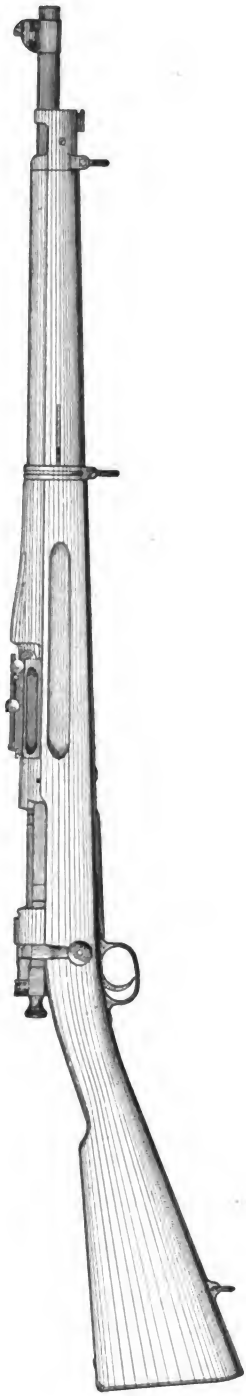

Fig. 2.

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U. S. MAGAZINE RIFLE, MODEL OF 1903, CAL. .30.

COMPONENT PARTS.

(One hundred and one in number.)

- Barrel:
  - Barrel. } Assembled.
  - Front Sight Stud. } Assembled.
  - Front Sight Stud Pin. } Assembled.
  - Rear Sight Base. } Assembled.
  - Rear Sight Base Pin. } Assembled.
  - Rear Sight Base Spline. } Assembled.
- Bayonet:
  - Bayonet Blade. } Assembled.
  - Bayonet Guard. } Assembled.
  - Bayonet Guard Rivets (2). } Assembled.
  - Bayonet Catch.
  - Bayonet Scabbard Catch.
  - Bayonet Spring.
  - Bayonet Grip, right. } Assembled.
  - Bayonet Grip Screw Washer. } Assembled.
  - Bayonet Grip, left. } Assembled.
  - Bayonet Grip Screw Nut. } Assembled.
  - Bayonet Grip Screw.
- Bolt:
  - Bolt. } Assembled.
  - Extractor Collar. } Assembled.
- Bolt Stop:
  - Bolt Stop Pin. } Assembled.
  - Bolt Stop Spring. } Assembled.
- Butt Plate:
  - Butt Plate.
  - Butt Plate Cap.
  - Butt Plate Cap Pin.
  - Butt Plate Cap Spring.
  - Butt Plate Cap Spring Screw.
  - Butt Plate Screw, large.
- Butt Plate Screw, small.
- Butt Swivel:
  - Butt Swivel. } Assembled.
  - Butt Swivel Pin. } Assembled.
  - Butt Swivel Plate. } Assembled.
- Butt Swivel Plate Screws (2).
- Cut-off:
  - Cut-off.
  - Cut-off Spindle.
  - Cut-off Spindle Screw.
  - Cut-off Spring.
  - Cut-off Spring Spindle.
- Ejector.
- Ejector Pin.
- Extractor.
- Firing Pin:
  - Cocking Piece. } Assembled.
  - Firing Pin Rod. } Assembled.
- Firing Pin Sleeve.
- Follower.
- Front Sight:
  - Front Sight.
  - Front Sight Pin.
  - Front Sight Movable Stud.
  - Front Sight Movable Stud Screw.
- Floor Plate.
- Guard:
  - Guard.
  - Floor Plate Catch.
  - Floor Plate Catch Pin.
  - Floor Plate Catch Spring.
- Guard Screw, front.
- Guard Screw, rear.
- Guard Screw Bushing.
- Hand Guard.

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Lower Band.
Lower Band Spring.
Lower Band Swivel.
Lower Band Swivel Screw.
Magazine Spring.
Mainspring.
Rear Sight:
  Base Spring. } Assembled.
  Drift Slide. } Assembled.
  Drift Slide Pin. } Assembled.
  Joint Pin. } Assembled.
  Leaf. } Assembled.
  Movable Base. } Assembled.
  Slide. } Assembled.
  Slide Binding Screw. } Assembled.
  Slide Binding Screw Pin. } Assembled.
  Slide Cap. } Assembled.
  Slide Cap Screw. } Assembled.
  Windage Screw. } Assembled.
  Windage Screw Collar. } Assembled.
  Windage Screw Knob. } Assembled.
  Windage Screw Knob Pin. } Assembled.
  Windage Screw Spring. } Assembled.
Receiver.
Safety Lock:
  Safety Lock Spindle. } Assembled.
  Safety Lock Spring. } Assembled.
  Safety Lock Spring Spindle. } Assembled.
  Safety Lock Thumb Piece. } Assembled.
Sear. } Assembled.
Sear Joint Pin. } Assembled.
Sear Spring. } Assembled.
Sleeve:
  Sleeve. } Assembled.
  Sleeve Lock. } Assembled.
  Sleeve Lock Pin. } Assembled.
  Sleeve Lock Spring. } Assembled.
Stacking Swivel. } Assembled.
Stacking Swivel Screw. } Assembled.
Stock. } Assembled.
Striker. } Assembled.
Trigger. } Assembled.
Trigger Pin. } Assembled.
Upper Band. } Assembled.
Upper Band Screw. } Assembled.

Fig. 3.

APPENDAGES.

Front Sight Cover.
Oiler and Thong Case:
  Oiler and Thong Case, Collar, and Partition.
  Thong Case Cap and Leather Pad.
  Oiler Cap and Dropper.
  Oiler Cap Washer.
Thong and Brush:
  Brush.
  Thong Cord.
  Thong Tip.
  Thong Weight.

ACCESSORIES.

Cleaning Rod.
Screw-driver.

DESCRIPTION AND NOMENCLATURE.

The Rifle is shown in Figs. 1 and 2.

The BARREL, with the FRONT SIGHT STUD and REAR SIGHT BASE attached, is shown in Fig. 3. It is 24.006 inches in length, and the rifling consists of four plain grooves, 0.004 inch deep. The grooves are three times the width of the lands. The twist is uniform, one turn in 10 inches.

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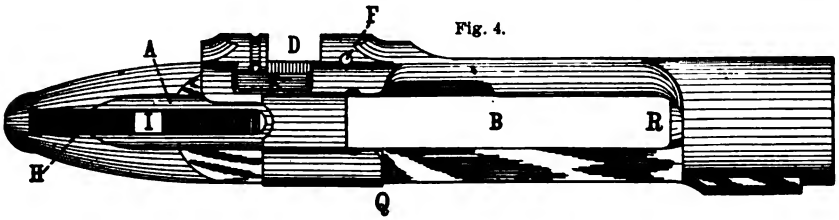
The muzzle is rounded to protect the rifling, and the tenon at the rear is threaded for the purpose of securing the receiver to the barrel.

On the top in rear of the front sight stud is stamped the Ordnance escutcheon, the initials of the place of manufacture and the month and year. Those manufactured prior to 1906 are stamped "'05" without the month.

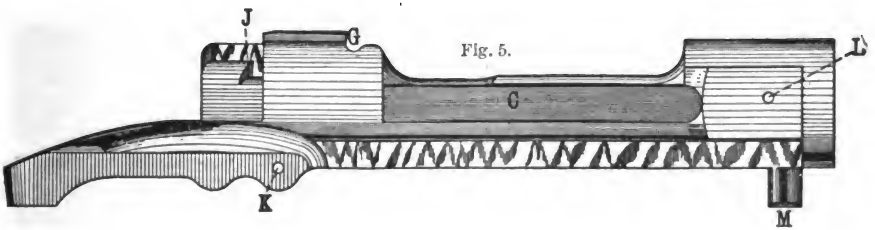
The removal from the barrel of the front sight stud, rear sight base, or receiver should never be attempted except by competent workmen, in armories fully equipped with the necessary tools and appliances.

Fig. 4.



The RECEIVER, Fig. 4, top view, Fig, 5, right side view, and Fig. 6, front end view, has the hole; A, called the *well*, which receives the bolt; the *magazine opening*, B; the *channel*, C, for the top locking lug; the *cut-off seat*, D; the *cut-off thumb piece recess*, E; *ejector pin hole*, F; *clip slots*, G; *cocking piece groove*, H; *sear nose slot*, I; *extracting cam*, J; *sear joint pin hole*, K; *gas escape hole*, L; *recoil lug*, M, in

Fig. 5.

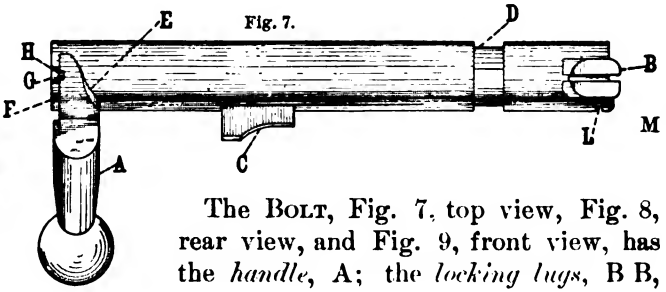


which is the hole for the front guard screw; the *recesses for the bolt locking lugs*, N N; the *locking cams*, O O; the *locking shoulders*, P P; the *safety shoulder*, Q; and the *cartridge ramp*, R.

On the upper surface of the front end is stamped the serial number of the rifle and the place of manufacture.

Fig. 6.

Fig. 7.



The BOLT, Fig. 7, top view, Fig. 8, rear view, and Fig. 9, front view, has the *handle*, A; the *locking lugs*, B B,

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which sustain the shock of the discharge, the one on top being slotted to allow the passage of the point of the ejector; the *safety lug*, C, which comes into play only in the event of the locking lugs yielding under powder pressure; the *extractor collar groove*, D; *extracting cam*, E; *sleeve clearance*, F; *safety lock spindle notch*, G; *sleeve lock notch*, H; *firing pin hole*, I; *cocking cam*, J; *cock notch*, K; *extractor tongue groove*, L; *gas escape hole*, not shown in cut, between the locking lugs; the *rim*, M; and *two small circular notches*, not shown in cut, on the left side of the slotted locking lug; this side of the lug rotates 90° when the bolt is drawn back for loading, and one of the notches engages with the *bolt stop pin*, A, Fig. 10, in either single or magazine loading, retaining the bolt in place.

Fig. 8.

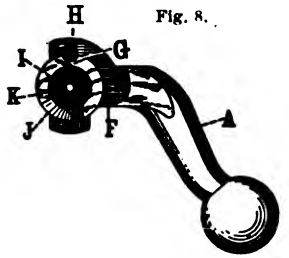


Fig. 9.

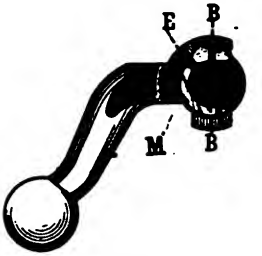
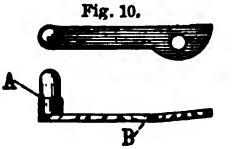


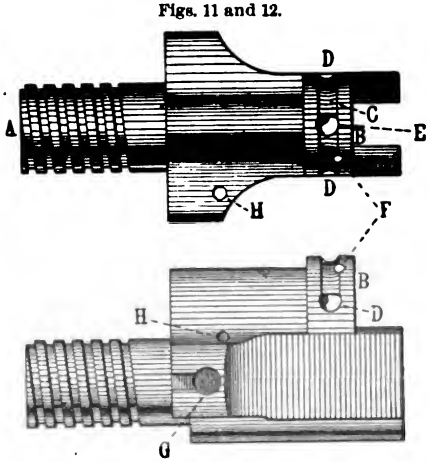
Fig. 10.



The Bolt Stop, Fig. 10, consists of the *pin*, A, and the *spring*, B, riveted together in manufacture. The pin projects through its hole in the receiver just in front of the cut-off opening, and is held in place and operated by the spring which fits into a slot in the receiver in the rear of the magazine.

The Sleeve, Fig. 11, top view, and Fig. 12, left side view, has the *barrel*, A, which is threaded for the purpose of securing the sleeve to the bolt; the *safety lock seat*, B; the *safety lock spring spindle groove*, C; the *recesses*, D, for retaining the safety lock when turned to the right or left; the *recess*, E, for retaining safety lock in dismounting bolt mechanism; the *bevel*, F, for dismounting the safety lock from the sleeve; the *sleeve lock recess*, G; and the *sleeve lock pin hole*, H. There are also the *safety lock spindle* and *firing pin holes*, the *cocking piece groove* and the *undercut* for the rear end of the bolt. None of the last four is shown in the cut.

Figs. 11 and 12.



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The SLEEVE LOCK, Fig. 13, left end view, and Fig. 14, under side view, has the *spindle*, A, which is bored out to receive the sleeve lock spring; the *latch*, B, and the *sleeve lock pin groove*, C. It is designed to prevent accidental turning of the sleeve when the bolt is drawn back.

Fig. 13.

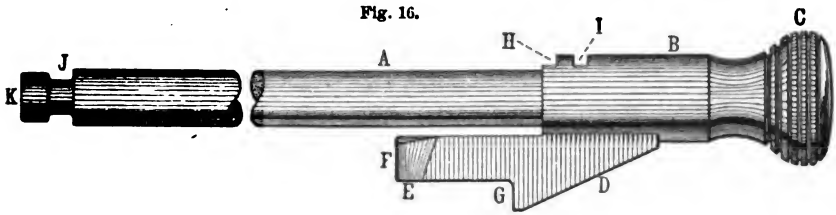
Fig. 14.

Fig. 15.

The SLEEVE LOCK SPRING and PIN are shown in Fig. 15.

The FIRING PIN, Fig. 16, consists of the *firing pin rod*, A, and the *cocking piece*, B, which are made separately, the former being

Fig. 16.

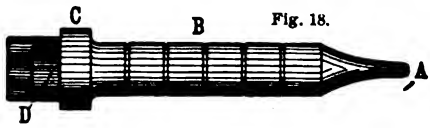


screwed into the latter and riveted in assembling; the length of the rod is so adjusted that when the front end of the cocking piece bears against the interior shoulder of the sleeve the striker point will project the proper distance beyond the face of the bolt. Other parts are the *knob*, C; *lug*, D; *cocking cam*, E; *nose*, F; *sear notch*, G; *locking shoulder*, H; *locking groove*, I; *neck*, J; and *head*, K.

The FIRING PIN SLEEVE, Fig. 17, sectional view, fits over the front end of the firing pin and the rear end of the striker, cover-

Fig. 17.

Fig. 18.



ing the joint hole, and preventing accidental separation of the firing pin and striker; its rear end forms the front bearing for the mainspring.

The STRIKER, Fig. 18, has the *point*, A; the *body*, B; the *shoulder*, C; and the *joint hole*, D, by which it is secured to the firing pin. The annular grooves on the striker retain the lubricating oil and prevent the accumulation of rust thereon.

The MAINSPRING is shown in Fig. 19.

Fig. 19.

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The EXTRACTOR, Fig. 20, inside view, Fig. 21, top view, and Fig. 22, front end view, has the *hook*, A, by which the cartridge case is extracted from the chamber; the *tongue*, B, which rides in

Fig. 20.

Fig. 22.

Fig. 21.

its groove at the front end of the bolt; the *lug*, C C, which is undercut to receive the ears on the lugs of the extractor collar; the *gas escape hole*, D; and the *back rest*, E, which is curved to fit the circle of the bolt.

The EXTRACTOR COLLAR, Fig. 23, end view, and Fig. 24, side view, has the *ears*, A A, which fit in the undercuts on the inside of the extractor, by which means and with the assistance of the extractor tongue and groove the extractor is held in place. The collar is bent into position on the bolt in manufacture, and should not be removed unless proper tools are at hand to replace it.

Fig. 24. Fig. 23.

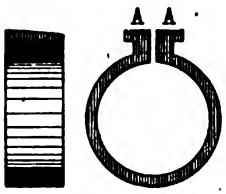
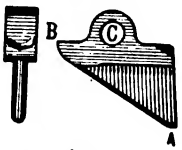


Fig. 25.

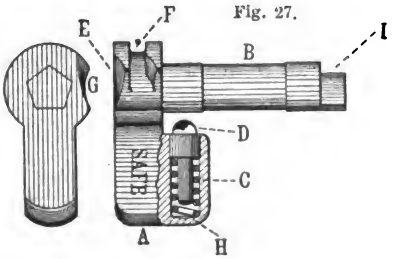


The EJECTOR, Fig. 25, has the *point*, A; the *heel*, B, and the *ejector pin hole*, C. It is hinged on the ejector pin in its recess in the left side of the receiver, ejection being accomplished by the slotted lug on the bolt coming in contact with the heel when the bolt is drawn to the rear.

Fig. 26.

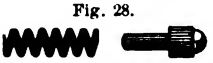
The head of the EJECTOR PIN, Fig. 26, is slotted for the purpose of providing sufficient tension to hold the pin in its place during the process of assembling.

Fig. 27.



The SAFETY LOCK, Fig. 27, rear and side views, consists of *thumb piece*, A, the *spindle*, B, *spring*, C, and *spring spindle*, D, assembled in manufacture. It has the *cam*, E; the *locking groove*, F; the *cocking piece groove*, G; the *spring spindle hole*, H; and the *bolt clearance*, I. The spring and spring spindle are shown in Fig. 28; the latter, projecting into its groove in the sleeve, under the

Fig. 28.



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action of the spring, prevents any movement of the safety lock to the rear, and when in the recesses in the groove, retains the safety lock turned either to the right or left or in the vertical position for dismounting bolt mechanism. The words "Safe" and "Ready" impressed on opposite sides of the thumb piece indicate that the firing mechanism is locked or ready for firing.

The GUARD, of which the body of the magazine forms a part, is shown in Fig. 29, top view, and Fig. 30, right side view. Its parts are:

Fig. 29.

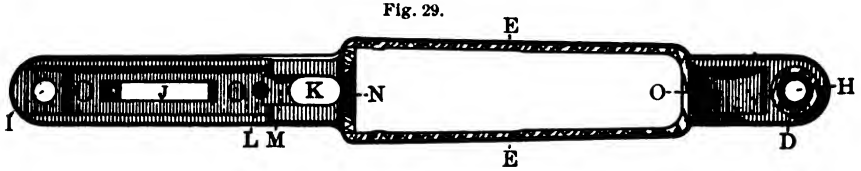
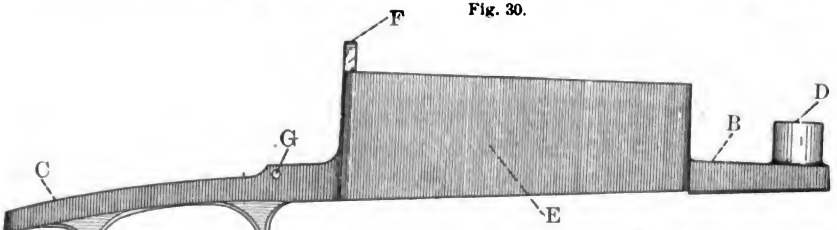


Fig. 30.



guard bow, A; *front tang*, B; *rear tang*, C; *front guard screw stud*, D; *magazine walls*, E; *rear end of magazine*, F; *floor plate catch pin hole*, G; *front guard screw hole*, H; *rear guard screw hole*, I; *trigger slot*, J; *floor plate lug slot*, K; *floor plate catch spring hole*, L; *floor plate catch slot*, M; *ramp*, N; and the *lightening cuts*, O.

The GUARD SCREW BUSHING, Fig. 31, fits tightly into the stock between the receiver and the guard plate, and serves as a stop for the screw, preventing its being screwed down tight enough to cramp the guard plate.

Fig. 31.

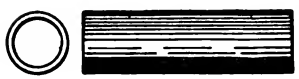
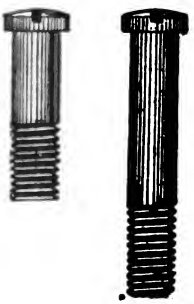


Fig. 32. Fig. 33.



The GUARD SCREWS, front and rear, Figs. 32 and 33, secure the guard to the receiver.

The FLOOR PLATE, Fig. 34, inside view, and Fig. 35, sectional view, has the *tenon*, A, which fits into a groove at the front end of the magazine and with the assistance of the floor plate catch retains the floor plate securely in its place at the bottom of the magazine; the *lug*, B, which is slotted to receive the floor plate catch and has

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a tenon on its front end which fits into a slot in the magazine; the *cavity*, C, through which the floor plate catch is released by means of the end of a bullet; the *magazine spring recess*, D, and the *magazine spring seat*, E.

Fig. 34.

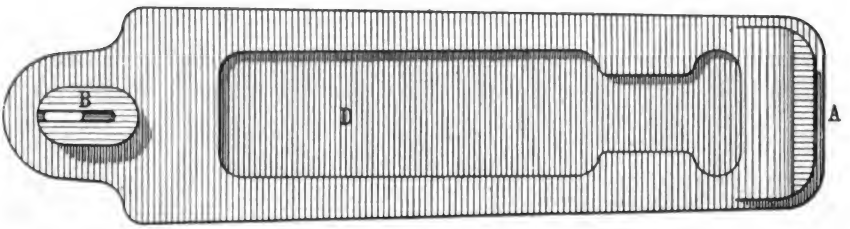
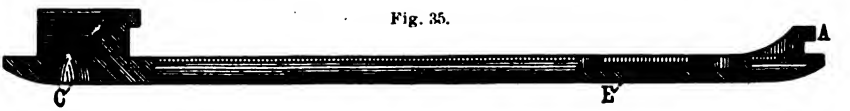


Fig. 35.



The FLOOR PLATE CATCH, Fig. 36, hinges on the FLOOR PLATE CATCH PIN, Fig. 37, and is operated by the FLOOR PLATE CATCH SPRING, Fig. 38. Its function is to retain the floor plate in its seat.

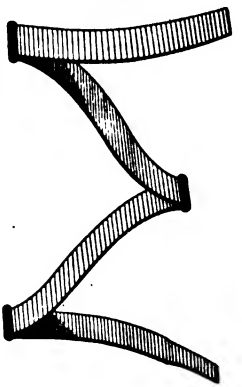
Fig. 36.

Fig. 37.

Fig. 38.

The MAGAZINE SPRING is shown in Fig. 39; the smaller end slides into the undercuts on the follower, and the larger end fits in the same way into the undercuts in the floor plate.

Fig. 39.



The FOLLOWER, Fig. 40, top view, and Fig. 41, right side view, has the *rib*, A, which serves to locate the cartridges in the magazine and guides the last cartridge into the chamber; the *front stop for the magazine spring*, B; the *rear stop for magazine spring*, C, and the *lugs*, D, in which are the undercuts for the magazine spring.

Fig. 40.

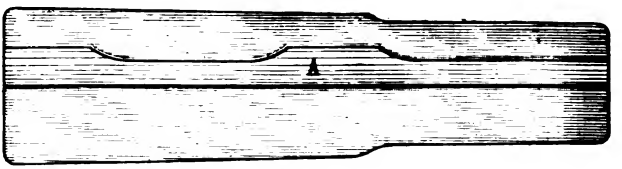


Fig. 41.

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The CUT-OFF, Fig. 42, side view, Fig. 43, rear view, and Fig. 44, outer edge, has the *thumb piece*, A; *body*, B; *magazine fire groove*, C; *dismounting groove*, D; *cut-off spindle hole*, E; *cut-off spring spindle hole*, F; *cut-off spindle screw hole*, G, and the *serrature*, H. The words on opposite sides of the thumb piece show to the firer whether the magazine is "on" or "off," the "on" side being polished for the purpose of showing to the commander, at a glance, that the piece is prepared or being used for magazine fire. When the cut-off thumb piece is turned down, indicating "off," and the bolt is drawn to the rear, the rear end of the slotted locking lug stops against the projecting front end of the cut-off body. The piece is then ready for single loading. When the cut-off thumb piece is turned up, indicating "on," and the bolt is drawn to the rear, the rear end of the slotted locking lug stops against the shoulder at the rear end of the magazine fire groove. The piece is then ready for loading from the magazine. When the cut-off thumb piece is in the intermediate position, the *dismounting groove*, D, permits the bolt to be drawn entirely out of the receiver.

Fig. 42.

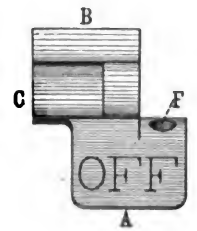
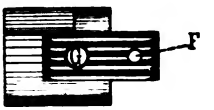


Fig. 43.

Fig. 44.



The CUT-OFF SPINDLE, Fig. 45, has the *cut-off spindle screw groove*, A, and the *dismounting groove*, B.

The CUT-OFF SPINDLE SCREW, Fig. 46, goes through the cut-off from the outer edge of the thumb piece, its end fitting into the groove in the cut-off spindle.

Fig. 45.

Fig. 46.

Fig. 47.

Fig. 48.

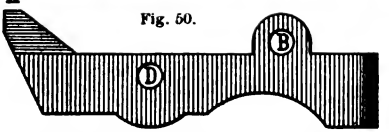
The CUT-OFF SPRING, Fig. 47, and its SPINDLE, Fig. 48, retain the cut-off in its seat in the receiver with the thumb piece turned up for loading from the magazine, down for single loading, or in the intermediate position for permitting the removal of the bolt. The spindle head works in a groove in left side of receiver, having three small notches corresponding to the above positions of the cut-off.

Fig. 49.

Fig. 51.

Fig. 52.

Fig. 50.



The SEAR, Fig. 49, top view, and Fig. 50, right side view, has the *sear nose*, A; *joint pin hole*, B; *trigger slot*, C; *trigger pin hole*, D, and *sear spring seat*,

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E, which is occupied by the SEAR SPRING, Fig. 51, its upper end bearing against the receiver.

The SEAR JOINT PIN, Fig. 52, hinges the sear in the receiver.

The TRIGGER, Fig. 53, right side view, and Fig. 54, front view, is hinged in its slot in the sear by the TRIGGER PIN, Fig. 55. It has the *finger piece*, A; the *bearing*, B; *trigger pin hole*, C; *heel*, D; and the *stop*, E.

The FRONT SIGHT, Fig. 56, is secured in its slot in the front sight movable stud by the FRONT SIGHT PIN, Fig. 57; the pin is tapering, and its small end is driven in from the right and *the ends* upset to prevent accidental removal.

Fig. 53.

Fig. 54.

Fig. 55.

Fig. 56.

Fig. 57.

Fig. 58.

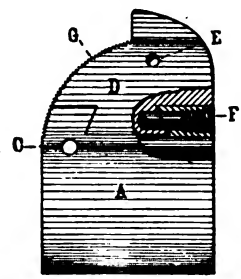
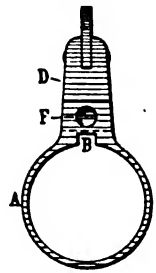


Fig. 59.



The FRONT SIGHT STUD and FRONT SIGHT MOVABLE STUD, with FRONT SIGHT in place, are shown assembled, Fig. 58, right side view, and Fig. 59, front view. The FRONT SIGHT STUD, A, has a *slot*, B, which, bearing on a lug on the upper side of the barrel, prevents lateral displacement of the stud; and *hole*, C, for the FRONT SIGHT STUD PIN, which prevents longitudinal displacement of the stud. The FRONT SIGHT MOVABLE STUD, D, has the *front sight pin hole*, E. It is held by the undercut slot in the front sight stud and secured from lateral displacement by the FRONT SIGHT MOVABLE STUD SCREW, F. The recess for this screw is not drilled in the movable stud until the rifle has been targeted and the correct position of the movable stud determined. The *rear face*, G, of both the front sight stud and front sight movable stud is serrated to prevent any reflection of light from this surface interfering with the aiming.

The FIXED BASE of the Model of 1905 REAR SIGHT, Fig. 60, rear end view, and Fig. 61, right side view, has the *holes*, A and B, for the base pin and base spline, respectively, by which it is firmly secured to the barrel and lateral and longitudinal movement prevented; the *undercut*, D, for the tenon of the hand guard; the *lightening cuts*, E; the *barrel*

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hole, F; the *pivot lug*, G, for the movable base; the *undercut*, H, for the lip on the rear end of the movable base; the *undercut*, I, for the windage screw and the lip on the front end of the movable base; the *lug*, J, on the top of which are two zero marks for the wind gauge graduations; and the *chamfer*, K, the seat for the windage screw collar. This chamfer is carried to the rear to permit of the assembling of the fixed base and the windage screw. On the left side of the front lug the chamfer corresponding to K is merely a conical recess for the head of the windage screw.

Fig. 60.

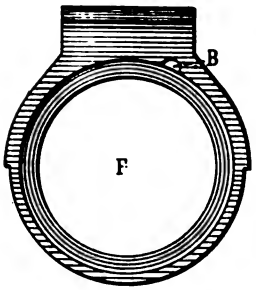
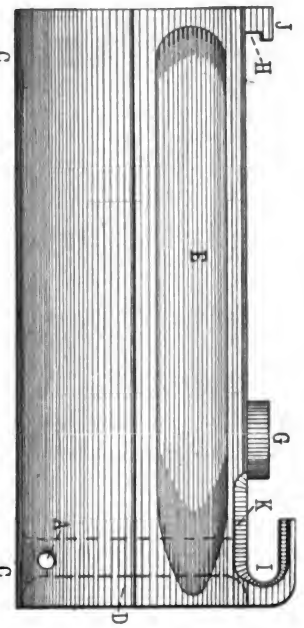


Fig. 61.



The BASE SPLINE locates and prevents the base from turning on the barrel.

The BASE PIN, similar to the base spline, prevents longitudinal movement of the base on the barrel.

The MOVABLE BASE, Fig. 63, top view, and Fig. 64, right side view, has the *ears*, A, in which are the *holes*, B, for the joint pin, which serves as a hinge for the leaf; the *wind gauge graduations*, C, each point of which corresponds to a lateral deviation of four inches for each 100 yards; the *lip*, D, which fits in the undercut in the rear end of the fixed base; the *spring opening*, E; the *spring seat*, F, which is undercut to admit the lip on the front end of the base spring; the *lip*, G, in which is a worm gear for the engagement of the windage screw; the *pivot hole*, H, for the pivot lug on the fixed base; and the *shoulders*, I, on which the front end of the leaf rests when down. The *hole*, K, is made for convenience in manufacture.

Fig. 63.

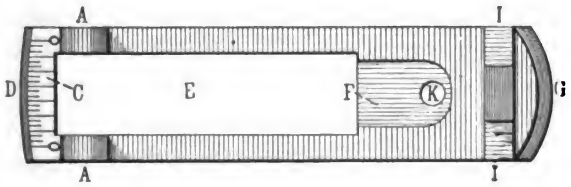


Fig. 64.

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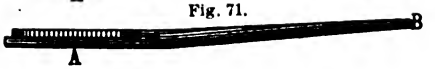
The WINDAGE SCREW consists of the *screw*, *collar*, *spring*, *knob*, and *knob pin*, Figs. 65, 66, 67, 68, and 69, respectively. The taper head

Fig. 65. Fig. 66. Fig. 67. Fig. 68. Fig. 69.

of the screw fits into the conical recess in the left side, and the taper of the collar into the chamfer in the right side of the fixed base; the thread on the screw engages the worm gear in the lip of the movable base. Under the action of the spring, lost motion due to wear is prevented between the windage screw and the movable base and between the windage screw and the front lug of the fixed base.

Fig. 70.

Fig. 71.



The BASE SPRING, Fig. 70, top view, and Fig. 71, side view, has the *lip*, A, which fits in the undercut in its seat in the movable base; the *free end*, B, and the *hole*, C, by which, with the aid of a drift made for the purpose, the spring is assembled or dismounted by driving it into or out of its seat in the movable base.

Fig. 72.

The JOINT PIN, on which the leaf hinges, is shown in Fig. 72. It is cylindrical, with rounded ends, and fits tightly in the ears of the base.

The LEAF, Fig. 73, top view (when down), and Fig. 74, right side view, has the *joint*, A, in which is the *joint pin hole;* the *rib*, B; the *undercut*, C, for the drift slide and the *sighting notch*, D. The free end of the base spring bears against the lower end of the leaf and maintains it in either its lowered or raised position. The leaf is graduated from 100 to 2,850 yards. The lines extending across one or both branches of the leaf are 100-yard divisions, the longer of the short lines are 50-yard and the shorter lines 25-yard divisions.

Fig. 73.

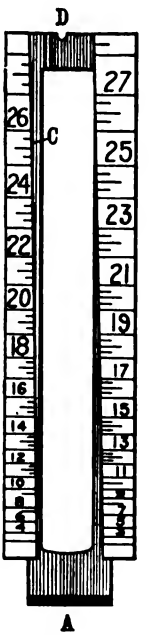


Fig. 74.

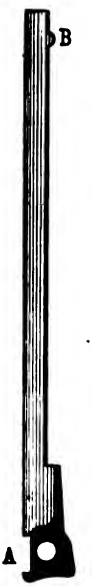


Fig. 75.

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The DRIFT SLIDE, Fig. 75, top view (leaf down) has the *peep*, A; the *field view*, B; the *drift slide pin*, C, riveted to the slide in manufacture; and the *open sighting notches*, D. The lines on either side of the peep and lower open notch enable the drift slide to be accurately set at any desired graduation on the leaf.

As the slide is moved up or down on the leaf the drift slide which carries the sighting notch moves with it and at the same time has a lateral movement in the undercut between the branches of the leaf, thus automatically correcting for drift. This movement corrects for all drift up to 600 yards, but for only part of the drift beyond that range.

With the leaf up, ranges from 100 to 2,350 yards can be obtained through the peep; from 100 to 2,450 yards through the open sighting notch at the bottom of field view; and from 1,400 to 2,750 yards through the open sighting notch in the upper edge of the drift slide.

The 2,850-yard range is obtained through the open notch in the upper end of the leaf.

With the leaf down the sights are set for 530 yards or battle line firing for the down position of the slide.

Fig. 76.

Fig. 77.

Fig. 78.

The SLIDE, Fig. 76, top view (leaf down), Fig. 77, front view (leaf down), and Fig. 78, right end view, has the *leaf slot*, A; the *clearance*, B, for the open notch in the drift slide; the *slide cap screw hole*, C; *slide binding screw hole*, D; *slide binding screw pin hole*, E; and the *dovetailed groove*, F, for the slide cap.

The SLIDE CAP, Fig. 79, top view (leaf down), and Fig. 80, cross section, has the *open notch*, A; *slide cap screw hole*, B; *slide binding screw pin hole*, C; the *groove*, D, for the drift slide pin; and the *clearance*, E, for the open notch in the drift slide.

Fig. 79.

Fig. 80.

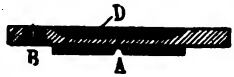

Fig. 81.

Fig. 82.

Fig. 83.

The cap is attached to the slide by entering the dovetailed groove at the right and by the slide cap screw at the left, thus securing the slide to the leaf.

The SLIDE CAP SCREW is shown in Fig. 81.

The SLIDE BINDING SCREW PIN, Fig. 82, is inserted in the *pin hole*, E, in the slide, Fig. 76, and fitting into a groove in the SLIDE BINDING

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Fig. 84.

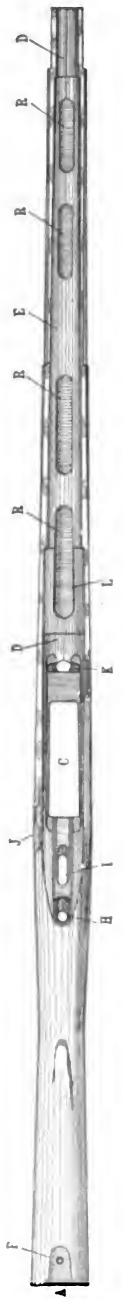
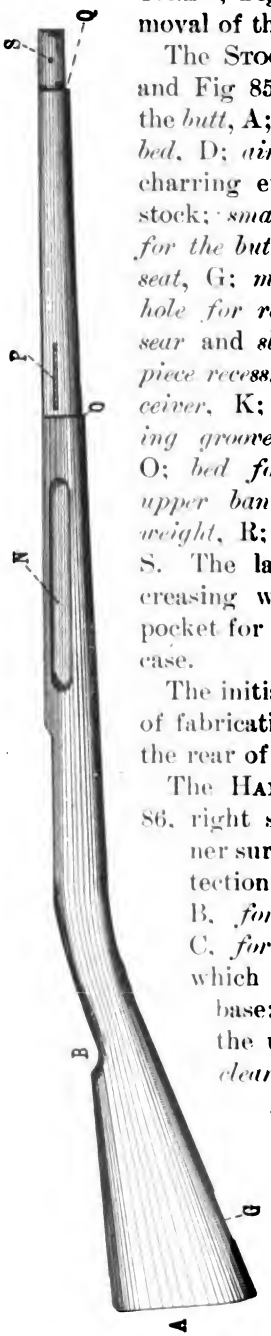


Fig. 85.



SCREW, Fig. 83, prevents the accidental removal of the latter.

The STOCK is shown in Fig. 84, top view, and Fig 85, right side view.[a] The parts are the *butt*, A; *small*, B; *magazine well*, C; *barrel bed*, D; *air chamber*, E, which reduces the charring effect of a heated barrel on the stock; *small butt plate screw hole* and *seat for the butt plate tang*, F; *butt swivel plate seat*, G; *mortise for receiver tang lug* and *hole for rear guard screw*, H; *mortise for sear* and *slot for trigger*, I; *cut-off thumb piece recess*, J; *mortise for recoil lug on receiver*, K; *bed for fixed base*, L; *grasping grooves*, N; *shoulder for lower band*, O; *bed for band spring*, P; *shoulder for upper band*, Q; *channels for decreasing weight*, R; and the *upper band screw hole*, S. The large hole in the butt is for decreasing weight, and the smaller one is a pocket for the combination oiler and thong case.

The initials of the inspector and the year of fabrication are stamped on the left side in the rear of the cut-off thumb piece recess.

The HAND GUARD, Model of 1905, Fig. 86, right side, and Fig. 87, bottom or inner surface, has the *swell*, A, for the protection of the rear sight; the *shoulder*, B, *for the lower band;* the *shoulder*, C, *for upper band;* the *rear tenon*, D, which enters the undercut in the fixed base; the *front tenon*, E, which enters the undercut in the upper band; the *clearance* F, *for the windage screw knob;* and the *air chamber*, H. The hole shown in the cut near the rear end of the inner surface is made for convenience in manufacture.

The BUTT PLATE is represented in Fig. 88. The parts are *toe*, A; *tang*, B; *cap hole*, C; *cap ears*, D,

[a] Stocks manufactured after February 20, 1908, are provided with a 0.185-inch tie bolt assembled transversely through the stock between the opening C and I for the purpose of strengthening the stock against splitting.

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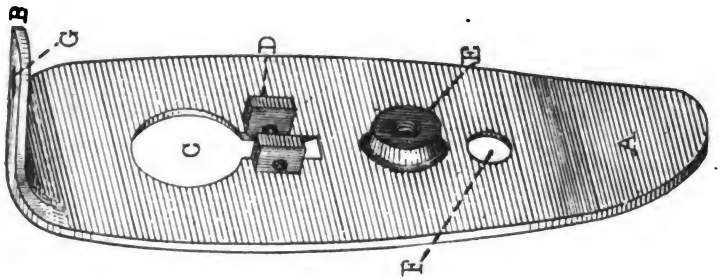
through which are the *cap pin holes; spring lug*, E; *large butt plate screw hole*, F; and *small butt plate screw hole*, G. A notch is cut into

Fig. 86.

Fig. 87.

the edge of the cap hole to facilitate the opening of the cap. For this purpose the flange of the head of a cartridge case can be used.

Fig. 88.



The large and small BUTT PLATE SCREWS, Figs. 89 and 90, secure the butt plate to the stock.

The BUTT PLATE CAP, Fig. 91, has the *cap pin hole*, A, and the *thumb notch*, B. The cap is hinged between the ears of the butt

Fig. 89.

Fig. 90.

Fig. 92.

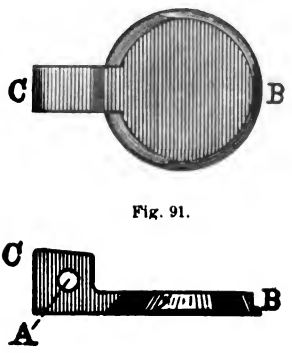


Fig. 91.

Fig. 94.

Fig. 93.

plate on the cap pin and is retained either closed or open by the free end of the CAP SPRING, Fig. 92, which bears on the *heel*, C.

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The BUTT PLATE CAP PIN, Fig. 93, after being driven into the holes in the ears of the butt plate and cap, has its ends slightly upset.

The BUTT PLATE CAP SPRING SCREW, Fig. 94, secures the cap spring to the lug on the butt plate, and is firmly screwed against the spring.

The BUTT SWIVEL includes the plate, swivel and pin assembled.

The BUTT SWIVEL PLATE, Fig. 95, has the *holes*, A, for the swivel plate screws; B for the swivel, and C for the swivel pin.

Fig. 95.

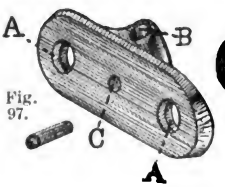
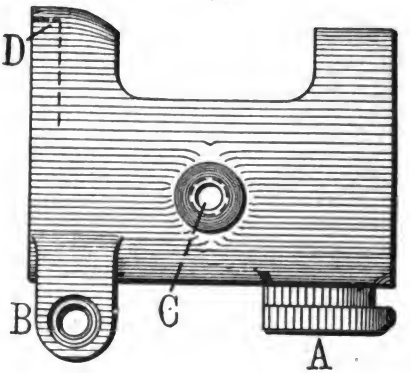


Fig. 97.

Fig. 96.

Fig. 98.



The BUTT SWIVEL, Fig. 96, is retained in the plate by the BUTT SWIVEL PIN, Fig. 97.

The BUTT SWIVEL SCREWS are the same as the small butt plate screw (see Fig. 90).

The UPPER BAND, Fig. 98, has the *bayonet lug*, A; the *ears*, B, in which are the holes for the stacking swivel screw; the *upper band screw hole*, C, and the *undercut*, D, for the front tenon on the hand guard.

The UPPER BAND SCREW, Fig. 99, secures the band to the stock, the thread under the head engaging the hole in right side of the band.

Fig. 99.

Fig. 101.

Fig. 100.

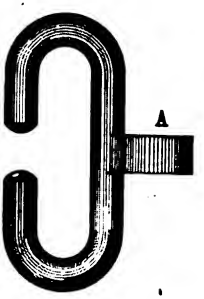
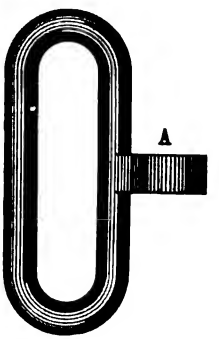


Fig. 102.



The STACKING SWIVEL, Fig. 100, is hinged by the *lug*, A, between the *ears*, B, of the upper band, on the STACKING SWIVEL SCREW, which

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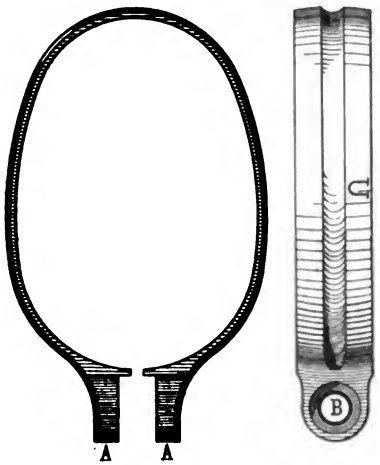
is like the screw shown in Fig. 101, but slightly longer. The threaded end of the screw is upset, after assembling, to prevent its being lost.

The LOWER BAND SWIVEL, Fig. 102, is hinged by its *lug*, A, between the ears of the lower band, on the LOWER BAND SWIVEL SCREW, Fig. 101. The threaded end of the screw is upset when in place.

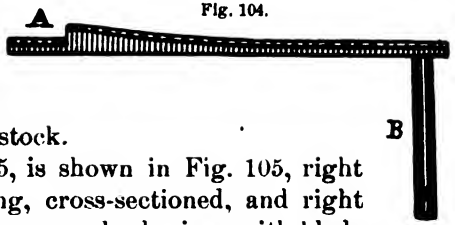
Fig. 103.



The LOWER BAND, Fig. 103, has the *ears*, A, and the *swivel screwholes*, B; the front or upper end is designated by the letter U. In rifles manufactured after June 30, 1906, the lower band and swivel are split between the ears in order to give better adjustment to the stock and hand guard and permit removal of the band without marring the stock.

The LOWER BAND SPRING, Fig. 104, has the *notch*, A, which holds the band in place, and the *spindle*, B, which retains the spring in the stock.

Fig. 104.



The BAYONET, Model of 1905, is shown in Fig. 105, right side view, with guard and tang, cross-sectioned, and right grip removed, and in Fig. 106, upper or back view, with blade cut off a short distance from the guard.

The *blade*, A, the *tang*, B, and the *pommel*, C, are forged in one piece; the front or lower edge is sharp along its entire length and the back for a distance of 5 inches from the point.

The blade is stamped on its left side with the Ordnance escutcheon and the initials of the place of manufacture, and on the right side with the letters U. S. and the serial number.

Immediately in the rear of the *guard*, D, the tang swells and is recessed to receive the *scabbard catch*, E, the *spring*, F, and the *spring cup*, G. The swell in the tang also serves as a seat for the guard which is riveted to the blade in manufacture.

The opening in the tang and pommel for the *bayonet catch*, H, connects with the recess in the swell of the tang and allows the front end of the bayonet catch to enter its seat in the scabbard catch. The

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undercut groove, I, receives the stud on the upper band when the bayonet is fixed, the bayonet being held in place by the bayonet catch projecting through the *hole*, K.

The BAYONET GUARD, Fig. 107, rear view, has the *barrel hole*, A; the *mortise*, B, for the blade: the *cut*, C, for the scabbard catch and scabbard hook; and the *clearance cut*, D, for the scabbard hook. There are also two rivet holes not shown in cut, by means of which the guard is riveted to the blade.

The BAYONET CATCH, Fig. 108, side view, has the *point*, A; the *hole*, B, which is a clearance for the bayonet grip screw; and the *hook*, C, which, projecting from the *hole*, K, in the pommel, engages the stud on the upper band and retains the bayonet in its place on the rifle.

The SCABBARD CATCH, Fig. 109, side view, has the *thumb piece*, A; the *hook*, B, which retains the bayonet in the scabbard by engaging the scabbard hook; and the *hole*, C, which receives the point of the bayonet catch.

The SCABBARD CATCH SPRING is shown in Fig. 110.

The RIGHT BAYONET GRIP, outside view, is shown in Fig. 111. The hole is counterbored to receive the GRIP WASHER, Fig. 112. A corresponding hole in the left grip is counterbored to receive the GRIP NUT, Fig. 113. The washer in the right grip receives the head, and the nut in the left grip receives the thread of the GRIP SCREW, Fig. 114, by means of which the grips are attached to the tang of the bayonet. The inner surfaces of the RIGHT and LEFT GRIPS

Fig. 105.

Fig. 106.

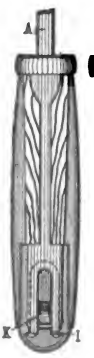

Fig. 107.

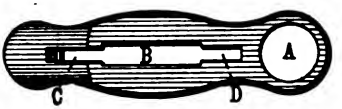

Fig. 108.

Fig. 109.

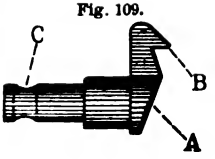

Fig. 110.

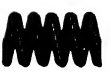

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Fig. 111.

Fig. 112.

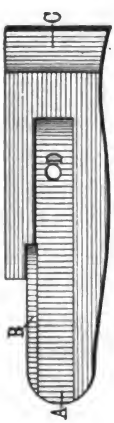
Fig. 113.

Fig. 114.

Fig. 115.

are shown in Figs. 115 and 116, respectively; there are the *clearance cuts*, A, for the *bayonet catch*, B, for the shoulder on the *pommel*, C, for the swell of the tang, and the *hole*, D, for the grip screw.

Fig. 116.



The BAYONET SCABBARD, Fig. 117, side view, Fig. 118, edge view, and Fig. 119, cross section of upper end, has the *wooden body*, A, made in two pieces and glued together; the *rawhide cover*, B, which increases the strength of the scabbard; the *leather cover*, C; the *mouthpiece*, D, riveted to the body by the *rivets*, E E: the *mouthpiece hooks*, F F, either of which by its engagement with the hook of the scabbard catch on the bayonet retains the bayonet in its place in the scabbard; the *scabbard hook*, G, attached to the body by the *hook rivet*, H, which passes through the *inside* and *outside washers*, I and K, and the *stop washer*, L; the *fastener*, M, and the *drain eyelet*, N. An offset on the

Fig. 119.

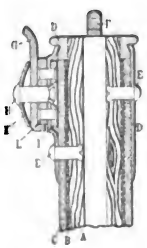


Fig. 117.

Fig. 118.

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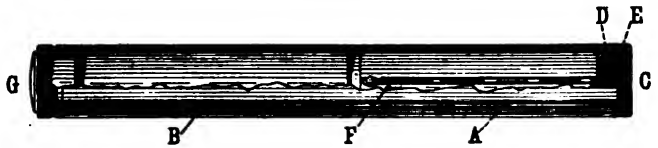
lower end of the hook, traveling in its recess in the stop washer, limits the oscillation of the hook to 50 degrees on each side of the vertical.

NOTE.—The cavalry will be equipped with the U. S. Magazine Rifle, Model of 1903, but without the bayonet or bayonet scabbard.

APPENDAGES AND ACCESSORIES.

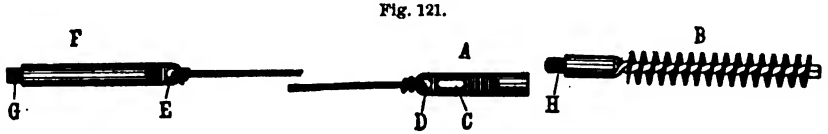
The OILER AND THONG CASE, Fig. 120, is carried in the butt of the stock. It consists of a nickel-plated brass tube, about 6 inches long and ¾ inch in diameter, divided transversely, near the center, by a

Fig. 120.



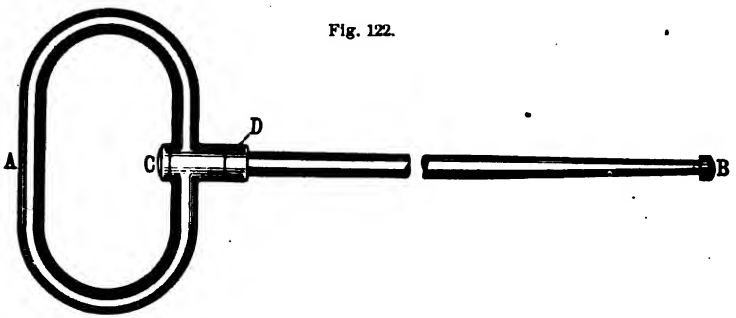
partition, with both ends fitted with screw caps. In one section is carried a small supply of sperm oil, and in the other the thong and brush used for cleaning the bore of the rifle. The cap on the oil section is fitted with a wire, flattened at its point, which reaches to the bottom of the section and is used for applying oil, a drop or more at a time. *The oil is only for the lubrication of working parts.* The cap is also provided

Fig. 121.



with a leather washer to prevent leakage. The cap on the thong section has a leather pad on its outer surface, which prevents the noise that would result from the oiler striking the butt plate cap. The oiler should always be inserted in the stock so that the leather-tipped cap will be next to the butt plate cap. The parts as shown in cut are:

Fig. 122.



Oiler, A; *thong case*, B; *oiler cap*, C; *collar*, D, into which the cap is screwed; *washer*, E; *dropper*, F, and *thong case cap*, G.

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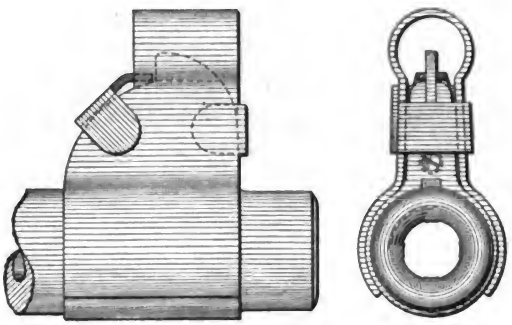
The THONG AND BRUSH are shown in Fig. 121. The *thong tip*, A, into which the *brush*, B, is screwed, is provided with a *rag slot*, C; the thong is knotted in the *hole*, D, in the tip, and also in the *hole*, E, in the weight. In cleaning the bore by means of the thong, the brush or rag should always be drawn from the muzzle toward the breech.

The CLEANING ROD, Fig. 122, is made of brass rod, 0.25 inch in diameter, and of sufficient length to extend through the barrel. It has the *handle*, A; the *knob*, B; the *steel collar*, C, riveted to the rod, and the *brass collar*, D, pinned to the rod. The handle swivels on the rod between the steel and brass collars.

The FRONT SIGHT COVER, Fig. 123, right side view, and Fig. 124,

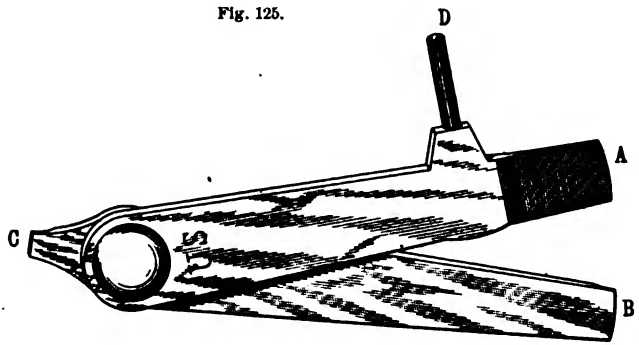
Fig. 123. Fig. 124.



front view, is made of sheet steel and pressed into shape. It is then casehardened, giving it sufficient spring to cause it to hug closely the barrel and front sight stud, thereby retaining its position on the barrel.

The SCREW-DRIVER, Fig. 125, has the *large blade*, A; the *small blade*, B; the *spur*, C, and the *pin*, D. The large blade should be used for

Fig. 125.



the large butt plate screw, the butt plate cap spring screw, and the guard screws; the small blade for all other screws, except the cut-off spindle screw, for which the spur should be used. The pin serves as a drift in removing the butt plate cap, ejector, floor plate catch, sear joint and trigger pins, and the band spring.

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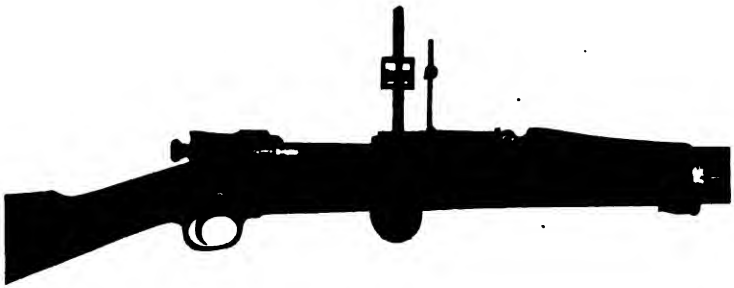
The BULLET JACKET EXTRACTOR is shown in Figs. 126, 127, and 128. This extractor consists of a steel cylindrical plug provided with lands and grooves on the sides. To use the extractor, it is inserted in the muzzle of the barrel hollow end (see Fig. 126) first. The extractor is then urged down the barrel by pressure applied with the cleaning rod until the jacket and extractor fall out into the chamber. (See company tool kit, page 39.)

Fig. 126. Fig. 127. Fig. 128.

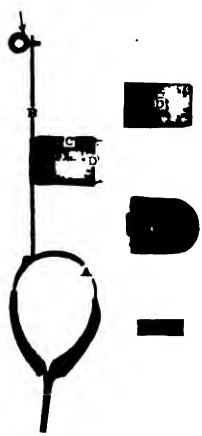
Fig. 129.



The AIMING DEVICE, Fig. 129, in place on the arm, and Fig. 130, in detail, is intended for use in aiming drill, and is issued to infantry, cavalry, and engineers at the rate of four per company. By it the instructor, while standing on one side and facing the rear sight on the rifle when the soldier is in the act of aiming, can see the reflection of both sights and the object aimed at and can therefore judge of the accuracy and steadiness of the soldier's aim.

The device consists of a circular spring steel *clip*, A, which embraces the barrel and a portion of the stock immediately in rear of the rear sight, a *standard*, B, riveted to the clip, and a sheet-steel *cage*, C, mounted on the standard, which carries a glass *reflector*, D.

Fig. 130.



The ends of the spring clip are covered with leather to prevent marring of the barrel and stock. This leather cover terminates in two loose flaps, by which the clip can be spread in seating and removing the device. The clip is shaped so that the device can be used on both the U. S. Magazine Rifle, Model of 1898, and the Model of 1903.

The upper end of the standard is drilled and tapped for a *screw eye*, E, which prevents accidental removal of the reflector cage.

The reflector cage consists of a back and a top and bottom. To the back is riveted a piece of sheet steel, shaped to engage the standard, forming a sliding bearing for the cage on the standard. A flat leaf *spring*, F, secured in this

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bearing, gives sufficient friction on the standard to hold the cage at the desired height. The top and bottom of the cage contain grooves, set at an angle of 45° with the barrel, in which is seated the reflector glass. The glass itself is plain sheet glass slightly smoked, with its edges rounded. The cage, standard, and clip are blued to prevent glaring reflection from sunlight, and in the case of the cage to furnish a mirror back for the glass.

To use the aiming device it should be seated firmly on the gun just in rear of the rear sight, taking care that the standard is vertical. The exposed edge of the reflector glass must always be to the rear in order to obtain a reflection of the sights. If the instructor desires to stand upon the soldier's right, the device must be placed on the gun so that the standard is on the left; if on the other side, the standard must be on the right side of the gun. In changing from one side to the other it is necessary to slip the cage off the standard and reverse it. The cage can be raised or lowered on the standard to suit the elevation used on the rear sight.

THE ASSEMBLED PARTS AND THEIR OPERATIONS.

Most of the operating parts may be included under the BOLT MECHANISM and MAGAZINE MECHANISM.

The BOLT MECHANISM consists of the bolt, sleeve, sleeve lock, sleeve lock pin, sleeve lock spring, extractor, extractor collar, cocking piece, safety lock, firing pin, firing pin sleeve, striker, and mainspring. It is shown, assembled, in Fig. 131. The parts shown in the cut are *handle*, A; *sleeve*, B; *safety lock*, C; *cocking piece*, D; *safety lug*, E; *extractor*, F; *extractor collar*, G; *locking lugs*, H; *extractor tongue groove*, I, and *gas escape hole*, J.

The bolt moves backward and forward and rotates in the well of the receiver; it carries a cartridge, either from the magazine, or one placed by hand in front of it, into the chamber and supports its head when fired.

The sleeve unites the parts of the bolt mechanism, and its rotation with the bolt is prevented by the lugs on its sides coming in contact with the receiver.

The hook of the extractor engages in the groove of the cartridge case and retains the head of the latter in the countersink of the bolt until the case is ejected.

The safety lock, when turned to the left, is inoperative; when turned to the right—*which can only be done when the piece is cocked*—the point of the spindle enters its notch in the bolt and locks the bolt; at the same time its cam forces the cocking piece slightly to the rear, out of contact with the sear, and locks the firing pin.

The bolt mechanism operates as follows: To open the bolt, raise the handle until it comes in contact with the left side of the receiver and pull directly to the rear until the top locking lug strikes the cut-off.

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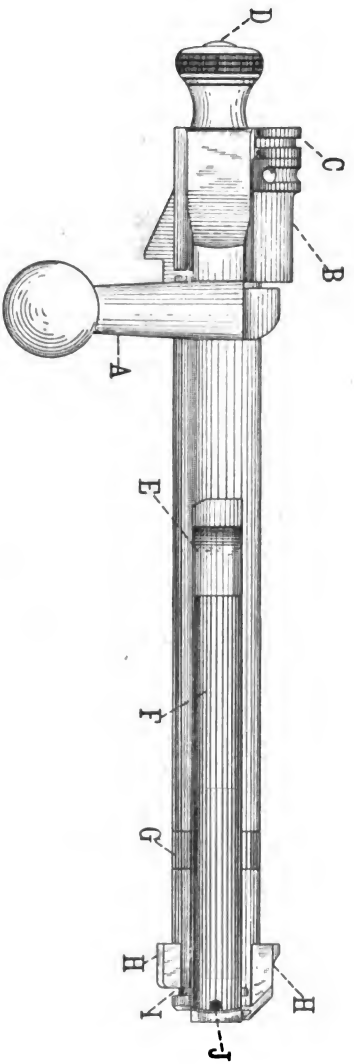
Raising the handle rotates the bolt and separates the locking lugs from their locking shoulders in the receiver, with which they have been brought into close contact by the powder pressure. This rotation causes the cocking cam of the bolt to force the firing pin to the rear, drawing the point of the striker into the bolt, rotation of the firing pin being prevented by the lug on the cocking piece projecting, through the slot in the sleeve, into its groove in the receiver. As the sleeve remains longitudinally stationary with reference to the bolt, this rearward motion of the firing pin, and consequently of the striker, will start the compression of the mainspring, since the rear end of the latter bears against the front end of the barrel of the sleeve and its front end against the rear end of the firing pin sleeve.

Fig. 131.



When the bolt handle strikes the receiver, the locking lugs have been disengaged, the firing pin has been forced to the rear until the sear notch of the cocking piece has passed the sear nose, the cocking piece nose has entered the cock notch in the rear end of the bolt, the sleeve lock has engaged its notch in the bolt, and the mainspring has been almost entirely compressed.

During the rotation of the bolt a rear motion has been imparted to it by its extracting cam coming in contact with the extracting cam of the receiver, so that the cartridge case will be started from the chamber.

The bolt is then drawn directly to the rear, the parts being retained in position by the cocking piece nose remaining in the cock notch and locked by the sleeve lock engaging its notch in the bolt.

To close the bolt, push the handle forward until the extracting cam on the bolt bears against the extracting cam on the receiver, thereby unlocking the sleeve from the bolt, and turn the handle down. As the handle is turned down the cams of the locking lugs bear against

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Fig. 132.

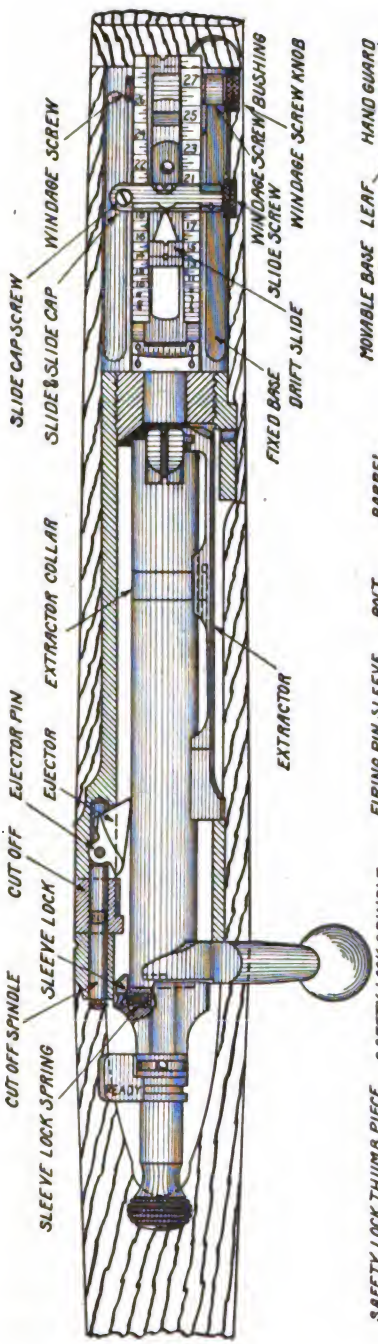
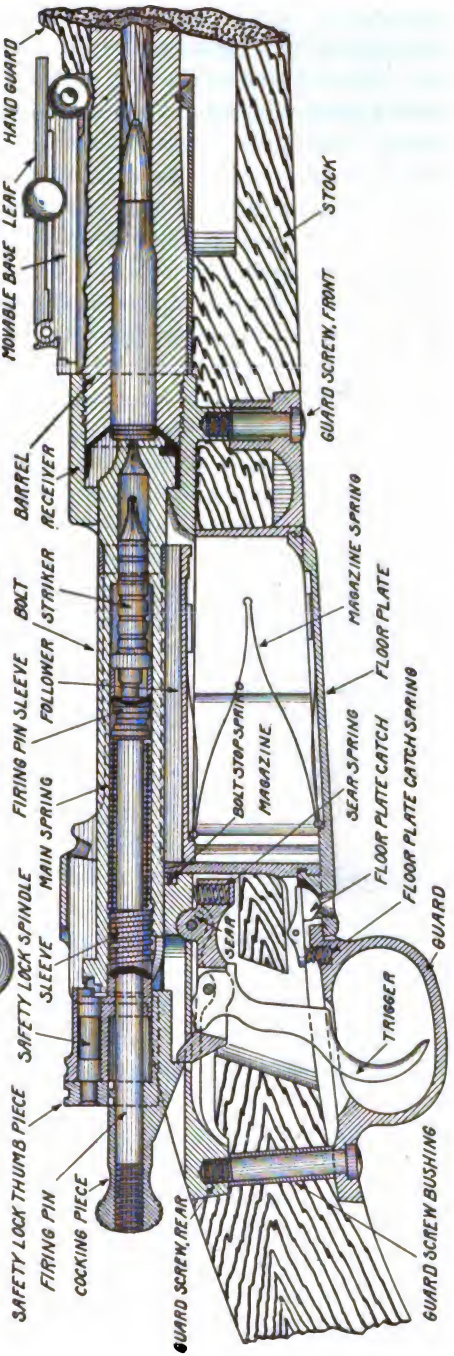


Fig. 133.



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the locking shoulders in the receiver, and the bolt is forced slightly forward into its closed position. As all movement of the firing pin is prevented by the sear nose engaging the sear notch of the cocking piece, this forward movement of the bolt completes the compression of the mainspring, seats the cartridge in the chamber, and, in single loading, forces the hook of the extractor into the groove of the cartridge case. In loading from the magazine the hook of the extractor, rounded at its lower edge, engages in the groove of the top cartridge as it rises from the magazine under the action of the follower and magazine spring.

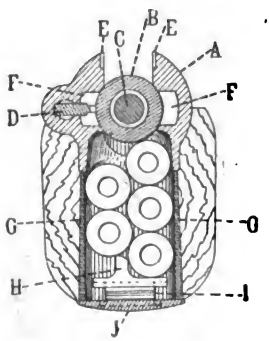
The position then occupied by the parts is shown in Fig. 132 and Fig. 133, and the piece is ready to fire.

To pull the trigger, the finger piece must be drawn to the rear until contact with the receiver is transferred from its bearing to the heel, which gives a creep to the trigger, and then until the sear nose is withdrawn from in front of the cocking piece.

Just before the bolt is drawn fully to the rear, the top locking lug strikes the heel of the ejector, throwing its point suddenly to the right in the lug slot. As the bolt moves fully to the rear, the rear face of the cartridge case strikes against the ejector point and the case is ejected, slightly upward and to the right, from the receiver.

Double loading from the magazine is prevented by the extractor engaging the cartridge case as soon as it rises from the magazine and holding its head against the face of the bolt until ejected.

Fig. 134.



It will be noted that in this system of bolt mechanism the compression of the mainspring, the seating of the cartridge in and the starting of the empty case from the chamber are entirely done by the action of cams.

The piece may be cocked either by raising the bolt handle until it strikes the left side of the receiver and then immediately turning it down or by pulling the cocking piece directly to the rear.

In firing, unless the bolt handle is turned fully down, the cam on the cocking piece will strike the cocking cam on the bolt, and the energy of the mainspring will be expended in closing the bolt, instead of on the primer; this prevents the possibility of a cartridge being fired until the bolt is fully closed.

The opening and closing of the bolt should each be done by one continuous motion.

The Magazine Mechanism includes the floor plate, follower, magazine spring, and cut-off.

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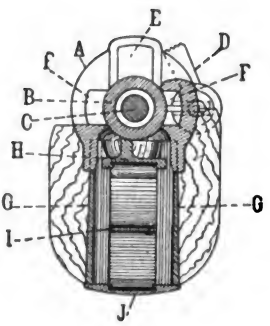
Fig. 134 represents a cross section through the ejector with the magazine loaded. The parts shown are *receiver*, A; *bolt*, B; *firing pin*, C; *ejector*, D; *clip slots*, E; *bolt locking lug channels*, F; *magazine*, G; *follower*, H; *magazine spring*, I; and *floor plate*, J.

Fig. 135 shows a cross section through the magazine with the magazine empty, and with cut-off "on," shown in projection. The parts are *receiver*, A; *bolt*, B; *firing pin*, C; *cut-off*, D; *rear lug slot*, E; *bolt locking lug channels*, F; *magazine*, G; *follower*, H; *magazine spring*, I; and *floor plate*, J.

To charge the magazine, see that the cut-off is turned up showing "on," draw the bolt fully to the rear, insert the cartridges from a clip, or from the hand, and close the bolt. To charge the magazine from a clip, place either end of a loaded clip in its seat in the receiver and, with the thumb of the right hand, press the cartridges down into the magazine until the top cartridge is caught by the right edge of the receiver. The manner in which the cartridges arrange themselves in the magazine and the position of the follower and compressed magazine spring are shown in Fig. 134. The cartridge ramp guides the bullet and cartridge case into the chamber. The magazine can be filled, if partly filled, by inserting cartridges one by one.

Fig. 135.



Pushing the bolt forward, after charging the magazine, ejects the clip.

When the cut-off is turned down, the magazine is "off." The bolt can not be drawn fully back, and its front end projecting over the rear end of the upper cartridge holds it down in the magazine below the action of the bolt. The magazine mechanism then remains inoperative, and the arm can be used as a single-loader, the cartridges in the magazine being held in reserve. The arm can readily be used as a single-loader with the magazine empty.

When the cut-off is turned up, the magazine is "on;" the bolt can be drawn fully to the rear, permitting the top cartridge to rise high enough to be caught by the bolt in its forward movement. As the bolt is closed this cartridge is pushed forward into the chamber, being held up during its passage by the pressure of those below. The last one in the magazine is held up by the follower, the rib on which directs it into the chamber.

In magazine fire, after the last cartridge has been fired and the bolt drawn fully to the rear, the follower rises and holds the bolt open to show that the magazine is empty.

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PRECAUTIONS.

If it is desired to carry the piece cocked, with a cartridge in the chamber, the bolt mechanism should be secured by turning the safety lock to the right. In this position it is important that the safety lock be kept turned *fully* to the right, since if it be turned to the left nearly to the "ready" position and the trigger pulled it is possible that the sear may not again engage the cocking shoulder. Should this happen the rifle will be discharged upon turning the safety lock fully to the ready position. Under no circumstances should the firing pin be let down by hand on a cartridge in the chamber.

To obtain positive ejection, and to insure the bolt catching the top cartridge in magazine, when loading from the magazine, the bolt must be drawn fully to the rear in opening it.

When the bolt is closed, or slightly forward, the cut-off may be turned up or down, as desired. When the bolt is in its rearmost position, to pass from loading from the magazine to single loading, it is necessary to force the top cartridge or follower below the reach of the bolt, to push the bolt slightly forward and to turn the cut-off down, showing "off."

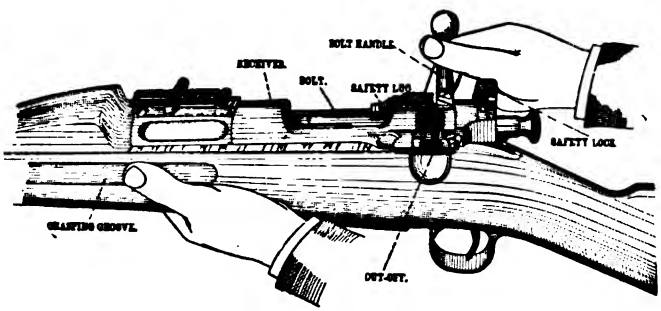
In case of a misfire it is unsafe to draw back the bolt immediately, as it may be a case of hang-fire. In such cases the piece should be cocked by drawing back the cocking piece.

It is essential for the proper working and preservation of all cams that they be kept lubricated.

DISMOUNTING AND ASSEMBLING BY SOLDIER.

The bolt and magazine mechanism can be dismounted without removing the stock. The latter should never be done, except for making repairs, and then only by some selected and instructed man.

Fig 136.



TO DISMOUNT BOLT MECHANISM.

Place the cut-off at the center notch; cock the arm and turn the safety lock to a vertical position, raise the bolt handle and draw out the bolt (Fig. 136).

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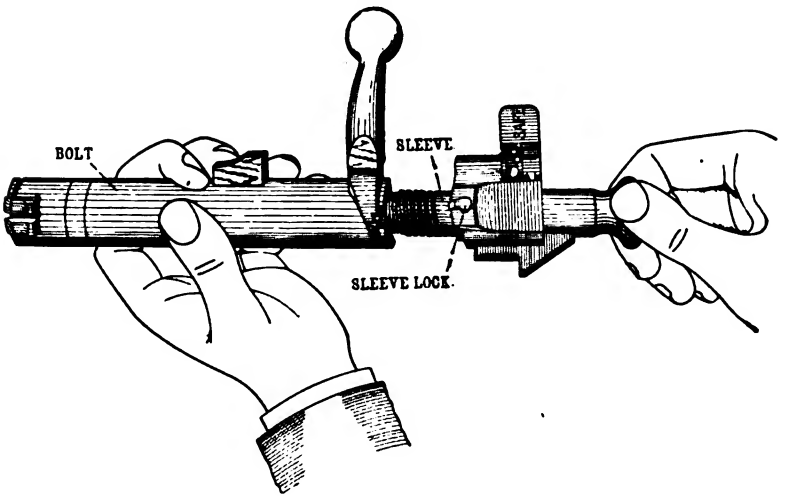
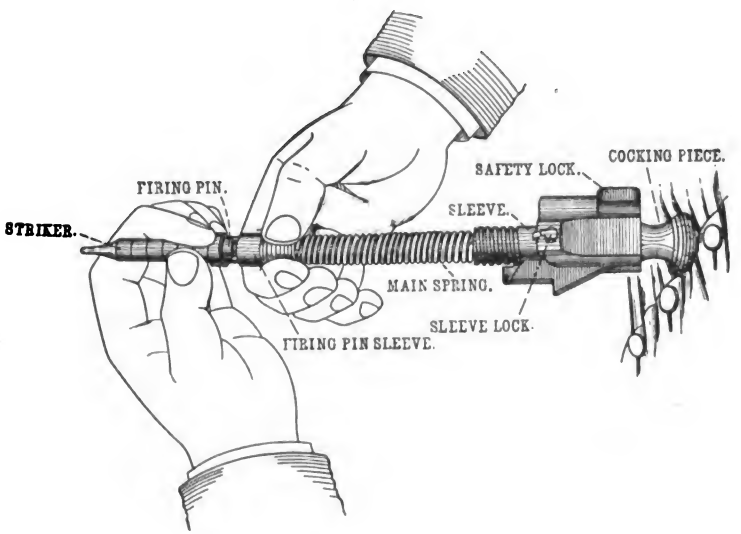
Hold bolt in left hand, press sleeve lock in with thumb of right hand to unlock sleeve from bolt and unscrew sleeve by turning to the left (Fig. 137).

Fig. 137.



Hold sleeve between forefinger and thumb of the left hand, draw cocking piece back with middle finger and thumb of right hand, turn safety lock down to the left with the forefinger of the right hand, in order to allow the cocking piece to move forward in sleeve, thus par-

Fig. 138.



tially relieving the tension of mainspring; with the cocking piece against the breast, draw back the firing pin sleeve with the forefinger and thumb of right hand and hold it in this position (Fig. 138) while

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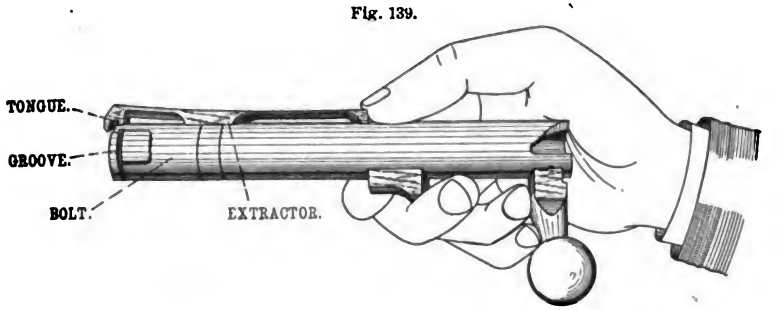
removing the striker with the left hand; remove firing pin sleeve and mainspring; pull firing pin out of sleeve; turn the extractor to the right, forcing its tongue out of its groove in the front of the bolt, and force the extractor forward (Fig. 139) and off the bolt.

TO ASSEMBLE BOLT MECHANISM.

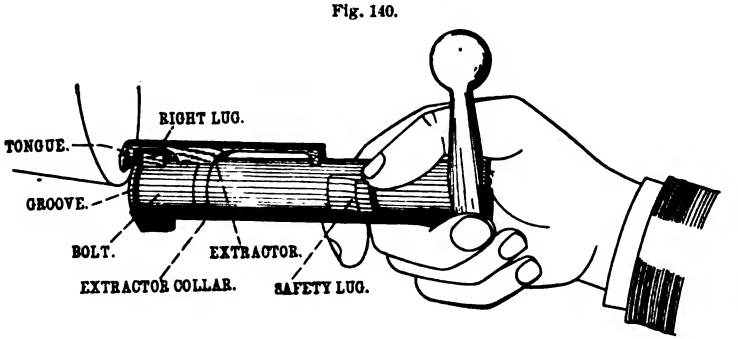
Grasp with the left hand the rear of the bolt, handle up, and turn the extractor collar with the thumb and forefinger of the right hand

Fig. 139.



until its lug is on a line with the safety lug on the bolt; take the extractor in the right hand and insert the lug on the collar in the undercuts in the extractor by pushing the extractor to the rear until its tongue comes in contact with the rim on the face of the bolt (a slight pressure with the left thumb on the top of the rear part of the extractor assists in this operation); turn the extractor to the right until it is over the right lug; take the bolt in the right hand and press the hook

Fig. 140.



of the extractor against the butt plate (Fig. 140) or some rigid object, until the tongue on the extractor enters its groove in the bolt.

With the safety lock turned down to the left to permit the firing pin to enter the sleeve as far as possible, assemble the sleeve and firing pin; place the cocking piece against the breast and put on mainspring, firing pin sleeve, and striker (see Fig. 140). Hold the cocking piece between the thumb and forefinger of the left hand, and by pressing the striker point against some substance, not hard enough to injure it, force the cocking piece back until the safety lock can be turned to the

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vertical position with the right hand; insert the firing pin in the bolt and screw up the sleeve (by turning it to the right) until the sleeve lock enters its notch on the bolt.

See that the cut-off is at the center notch; hold the piece under floor plate in the fingers of the left hand, the thumb extending over the left side of the receiver; take bolt in right hand with safety lock in a vertical position and safety lug up; press rear end of follower down with left thumb and push bolt into the receiver; lower bolt handle; turn safety lock and cut-off down to the left with right hand.

TO DISMOUNT MAGAZINE MECHANISM.

With the bullet end of a cartridge press on the floor plate catch (through the hole in the floor plate), at the same time drawing the bullet to the rear; this releases the floor plate.

Raise the rear end of the first limb of the magazine spring high enough to clear the lug on the floor plate and draw it out of its mortise; proceed in the same manner to remove the follower.

To assemble magazine spring and follower to floor plate, reverse operation of dismounting.

Insert the follower and magazine spring in the magazine, place the tenon on the front end of the floor plate in its recess in the magazine, then place the lug on the rear end of the floor plate in its slot in the guard, and press the rear end of the floor plate forward and inward at the same time, forcing the floor plate into its seat in the guard.

TO COMPLETE DISMOUNTING.

(Not to be done by soldier.)

The bolt and magazine mechanism having been dismounted, proceed as follows:

1. Turn safety lock to dismounting bevel on sleeve and remove it by striking the thumb piece a light blow.

2. To dismount the sleeve lock, drive out sleeve lock pin from the top and remove lock and spring, being careful not to lose the spring.

3. Remove front sight pin (see directions for replacing broken parts, page 41) and remove front sight.

4. Press in rear end of band spring and drive forward the lower band by a few sharp blows on the lug and then on top with a hardwood block.

5. Remove upper band screw and drive upper band forward, in the same manner prescribed for the lower band.

6. Move upper band forward on barrel until stopped by front sight movable stud, and then remove lower band by slipping it over front band and front sight movable stud. To remove upper band entirely from barrel requires the removal of the front sight movable stud screw and the front sight movable stud, which should be done only at the Springfield and Rock Island armories. It is for this reason that

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no upper bands are included in the parts issued for the repair of arms in the hands of troops.

7. Draw hand guard forward until free from the rear sight base and remove.

8. Remove guard screws and guard. It may be necessary to tap gently on the front and rear of the guard bow to loosen.

9. Remove barrel and receiver from stock.

10. To remove the lower band spring, drive its spindle out of its hole in the stock from the left.

11. Unscrew the butt swivel plate screws and remove the butt swivel plate from stock. The butt swivel, consisting of the plate, swivel, and pin, permanently assembled, is issued complete.

12. Unscrew butt plate screws and remove butt plate from stock.

13. Unscrew butt plate cap spring screw and remove the butt plate cap spring; drive out butt plate cap pin (see direction on page 41) and remove butt plate cap.

14. Remove cut-off by loosening the screw in the end of the thumb piece until it disengages the groove in the cut-off spindle; insert the blade of a screw-driver in the notch in the rear end of the spindle and force it out. Remove the spring and its spindle, being careful not to lose them.

15. Remove the ejector by driving out the ejector pin from the upper side.

16. Remove sear and trigger by driving out the sear joint pin from the right, being careful not to lose the sear spring.

17. Remove trigger from sear by driving out the trigger pin from either side.

18. Remove floor plate catch and spring by driving out the pin from either side.

19. Remove bolt stop by inserting a small punch or end of striker in the hole in the left end and forcing it from its pocket.

The rear sight leaf should never be removed from the base except for the purpose of making repairs.

The rear sight base and the front sight stud should never be removed from the barrel.

The barrel should never be unscrewed from the receiver.

TO ASSEMBLE AFTER DISMOUNTING.

Reverse and follow in inverse order the operations of dismounting.

In assembling the sleeve lock to the sleeve, be careful to compress the lock and spring while driving in the pin from the bottom of the sleeve.

To assemble the safety lock and sleeve, insert the safety lock spindle in its hole in the sleeve as far as it will go; then, with the thumb piece vertical and pressed against some rigid object, introduce the point of the tool provided for this purpose between the safety lock spindle and

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the safety lock spring spindle, forcing the latter into the thumb piece until it slips over the edge of the sleeve. Further pressure on the safety lock thumb piece, together with the gradual withdrawal of the tool, will complete the assembling.

In assembling pins and screws, note directions for replacing broken parts on pages 41 and 42.

The floor plate catch spring and the cut-off spring are alike, except in length. The latter being the longer, care should be taken not to substitute one for the other.

CLEANING AND CARE OF THE ARM.

As the bore of the rifle is manufactured with great care in order that a high degree of accuracy may be obtained, it should be carefully cared for. The residuum from smokeless powder tends to corrode the bore and should therefore be removed as soon after firing as practicable. The following method has been practiced at the Springfield Armory for a number of years with good results: Using the cleaning rod and small patches of cloth (preferably canton flannel), clean the bore thoroughly with patches soaked in a saturated solution of soda and water. Then thoroughly dry the bore and remove the soda solution by the use of dry patches, and finally oil the bore with patches soaked in cosmic oil. Twenty-four hours after this first cleaning, the bore should be again cleaned as described above, as it has been found that the powder gases are probably forced into the texture of the steel and will, if the second cleaning is not resorted to, cause rusting, no matter how thoroughly the bore may have been cleaned at first.

If, however, a cleaning rod is not at hand, the barrel should be cleaned as thoroughly as possible by means of the thong brush and rags, and oiled as above. To clean or oil the bore with rags, the thong brush is unscrewed, the rag placed in the rag slot of the thong tip and drawn from the muzzle toward the breech.

As neither ramrod nor jointed cleaning rod will be issued with the model of 1903 rifle, the cleaning rod should be carried into the field whenever practicable.

If gas escapes at the base of the cartridge, it will probably enter the well of the bolt through the striker hole. In this case the bolt mechanism must be dismounted and the parts and well of the bolt thoroughly cleaned.

Before assembling the bolt mechanism, the firing pin, the barrel of the sleeve, the body of striker, the well of bolt, and all cams should be lightly oiled.

Many of the parts can generally be cleaned with dry rags. All parts after cleaning should be wiped with an oiled rag.

The best method of applying oil is to rub with a piece of cotton cloth upon which a few drops of oil have been placed, thereby avoiding the use of an unnecessary amount of oil; this method will, even in

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the absence of the oiler, serve for the cams and bearings, which should be kept continually oiled.

Any part that may appear to move hard can generally be freed by the use of a little oil.

The stock and hand guard may be coated with raw linseed oil and polished by rubbing with the hand.

Sperm oil only shall be used for lubricating metallic bearing and contact surfaces.

For the chamber and bore, only cosmoline or cosmic shall be used. This should also be applied to all metallic surfaces, to prevent rusting when arms are stored or when not used for an appreciable length of time.

INSTRUCTIONS FOR REPAIRING U. S. MAGAZINE ARMS IN THE HANDS OF TROOPS.

The following parts only will be issued for repairs of arms in the hands of the troops:

COMPONENT PARTS.

Bayonet, complete.
Bayonet Catch.
Bayonet Scabbard Catch.
Bayonet Spring.
Bayonet Grip, right. } Assembled.
Bayonet Grip Screw Washer. } Assembled.
Bayonet Grip, left. } Assembled.
Bayonet Grip Screw Nut. } Assembled.
Bayonet Grip Screw.
Bolt, with extractor collar.
Bolt Stop, complete.
Butt Plate.
Butt Plate Cap.
Butt Plate Cap Pin.
Butt Plate Cap Spring.
Butt Plate Cap Spring Screw.
Butt Plate Screw, large.
Butt Plate Screw, small. } Same.
Butt Swivel Plate Screw. } Same.
Butt Swivel, complete.
Cut-off.
Cut-off Spindle.
Cut-off Spindle Screw.
Cut-off Spring.
Cut-off Spring Spindle.
Ejector.
Ejector Pin.
Extractor.
Firing Pin:
  Cocking Piece. } Assembled.
  Firing Pin Rod. } Assembled.
Firing Pin Sleeve.
Follower.
Floor Plate.
Floor Plate Catch.
Floor Plate Catch Pin.
Floor Plate Catch Spring.
Front Sight.
Front Sight Pin.
Guard.
Guard Screw, front.
Guard Screw, rear.
Guard Screw Bushing.
Hand Guard.
Lower Band.
Lower Band Spring.
Lower Band Swivel.
Lower Band Swivel Screw.
Magazine Spring.
Mainspring.
Rear Sight:
  Base Spring.
  Drift Slide. } Assembled.
  Drift Slide Pin. } Assembled.
  Joint Pin.

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Rear Sight—Continued.
- Leaf.
- Movable Base.
- Slide. } Fitted.
- Slide Cap. }
- Slide Binding Screw.
- Slide Binding Screw Pin.
- Slide Cap Screw.
- Windage Screw. } Assembled.
- Windage Screw Collar. } Assembled.
- Windage Screw Knob. } Assembled.
- Windage Screw Knob Pin. } Assembled.
- Windage Screw Spring. } Assembled.

Safety Lock, assembled.
- Sear.
- Sear Joint Pin.
- Sear Spring.
- Sleeve. } Assembled or separately.
- Sleeve Lock. } Assembled or separately.
- Sleeve Lock Pin. } Assembled or separately.
- Sleeve Lock Spring. } Assembled or separately.

Stacking Swivel.
- Stacking Swivel Screw.
- Stock.
- Striker.
- Trigger.
- Trigger Pin.
- Upper Band Screw.

APPENDAGES.

Front Sight Cover.

Oiler and Thong Case with Caps.
- Thong Case Cap and Leather Pad.
- Oiler Cap and Dropper.

Thong and Brush, complete.
- Brush.
- Thong Cord.
- Thong Tip.
- Thong Weight.

ACCESSORIES.

Cleaning Rod.

Screw-driver.

KIT OF TOOLS.

The following tools are issued to each company or troop and to each regimental or post ordnance officer for use in repairing the rifle and bayonet, and in regulating the socket spring of the woven cartridge belt, model of 1903. They are contained in a wooden chest, with hinges and lock.

- 1 Hammer (steel). } For use in upsetting the ends of the lower band and stacking swivel screws after assembling.
- 1 Block (steel). }
- 1 Anvil. }
- 1 Set (No. 1). }
- 1 Hammer (brass). } For regulating the socket spring in the woven cartridge belt, model of 1903.
- 1 Block (wood). }
- 1 Set (No. 2). }
- 3 Screw-drivers, for use in assembling and dismounting the following screws:
  - No. 1. Guard, large butt plate and butt plate cap spring screws.

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No. 2. Stacking swivel, lower band swivel, butt swivel, small butt plate, upper band and bayonet grip screws.
No. 3. Cut-off and slide cap screws.

1 Bullet Jacket Extractor (see page 26).

10 Drifts for the following springs and pins:
No. 1. Assembling and dismounting rear sight base spring.
No. 2. Removing trigger and butt plate cap pins.
No. 3. Starting front sight and sleeve lock pins.
No. 4. Driving out pin started with No. 3.
No. 5. Removing rear sight joint pin, and sear joint and ejector pins.
No. 6. Starting floor plate catch pin and removing bolt stop.
No. 7. Driving out floor plate catch pin and lower band spring.
No. 8 (2). Starting windage screw knob pin and slide screw pin.
No. 9. Removing pins started with No. 8.

1 Pair Pliers for use in assembling and dismounting the smaller parts.

1 Tool for assembling safety lock on sleeve.

These tools must be handled carefully and with skill to avoid injuring the heads and threads of screws and defacing other metallic parts.

The tools for regulating the socket spring of the woven cartridge belt were designed for the style of fastener on the first belts made which had a separate spring, but can be used, though with not as satisfactory results for the style of fastener without separate spring later adopted, known as the "Buck" fastener.

PACKING OF THE RIFLE.

The rifles are issued in arm chests containing:

10 United States magazine rifles.
10 front sight covers.
10 oiler and thong cases.
10 thongs and brushes.
2 cleaning rods.
2 screw-drivers.
2 drift slides and pins, .″04 peep.
2 drift slides and pins, .″06 peep.

The interior of the arm chest is provided with wooden packing strips for the purpose of securely holding the rifles in place in transportation. The arrangement of this packing and of the rifles should be carefully observed when arms are received from an arsenal in order that the same method may be used if for any reason the rifles should be shipped away from the post. Rifles should never be shipped in these chests unless all of the packing strips have been properly assembled with the rifles in the chests.

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The ends of these chests are provided with narrow pockets for the reception of the front sight covers, screw-drivers, and descriptive pamphlet which are shipped with the rifles.

The cover of the chest is provided with two spring-steel clips for holding the two brass cleaning rods which are packed in each arm chest. Plate II at the back of this pamphlet shows the arm chest in detail.

ARM LOCKER FOR U. S. MAGAZINE RIFLE, MODEL OF 1903.

This chest is issued at the rate of one per company or troop for use in the safe keeping of the surplus rifles of a company or troop. It is provided with reenforcing angle irons which secure the bottom of the chest to the sides; and with blind strap hinges, hasps and staples for securing the cover to the body of the chest. Two padlocks with chains and keys are also issued with each arm locker.

PARTS WHICH ARE MOST LIABLE TO REQUIRE REPAIR.

BOLT STOP.—Worn by continual contact with bolt.

COCKING PIECE.—Nose worn from neglect to keep it lubricated.

LOWER BAND SWIVEL AND SCREW.—Screw, if not riveted in place, works loose and, with swivel, is lost.

SAFETY LOCK.—Thumb piece knocked off by blow.

STACKING SWIVEL AND SCREW.—Screw, if not riveted, works loose and, with swivel, is lost.

STOCK.—Bruises, cuts, pieces chipped from different points, broken at small.

STRIKER.—Point burned by defective cartridge.

REPLACING BROKEN PARTS.

BUTT PLATE CAP PIN.—This pin has both ends upset; the burr on one end must be filed off and the pin driven out with a drift; when a new pin is put in its ends must be upset with light blows of a hammer.

FRONT SIGHT.—The burr on the left side must be filed off and the pin driven out from the left with a drift; when the new front sight is in place, a new pin is driven in from the right and its left end upset with light blows of a hammer.

LOWER BAND SWIVEL SCREW.—This screw, when in place, has its end upset and riveted over the band ear. It should never work loose, if properly assembled, and when it has to be removed to replace an injured swivel, the burr on the end should be filed off and the screw taken out, the end being again upset when the screw has been returned to its place.

STACKING SWIVEL SCREW.—As the screw is made long and its end upset, it should be kept well screwed up at all times. It is removed to replace a broken swivel and replaced as explained in preceding paragraph, care being taken to upset the *end* only.

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TRIGGER PIN.—This is a straight pin and can be driven in or out from either side.

INJURIES WHICH DO NOT RENDER PARTS UNSERVICEABLE.

BOLT.—The entire flange at front end may be broken off, except a small portion on the opposite side from the extractor hook, which is required to hold, in connection with the extractor hook, the empty case while it is being drawn to the rear for ejection.

If automatic ejection be not considered, the entire flange may be dispensed with.

BUTT PLATE.—Bruises, cuts, or wearing.

BUTT SWIVEL.—Bent.

COCKING PIECE.—Moderate wearing of nose. The nose can wear until raising and lowering the bolt handle fails to cock the piece.

EXTRACTOR.—Moderate wear or break of edge of hook.

FLOOR PLATE.—Bent or bruised.

GUARD.—Bent, bruised, or cut.

USING THE ARM WHEN CERTAIN PARTS OF THE BOLT AND MAGAZINE MECHANISM ARE WANTING.

The parts not essential, or only so to a degree, are the ejector, safety lock, cut-off, bolt stop, sleeve lock, floor plate, magazine spring and follower.

In the absence of the ejector, the empty cases drawn to the rear by the extractor can be removed from the receiver by the finger.

The safety lock being merely a precautionary device, its absence does not affect the usefulness of the arm.

In the absence of the cut-off, the arm can be loaded from the magazine, but the magazine can not be held full in reserve; in single loading with the cut-off wanting and magazine empty, the soldier should be instructed to load directly into the magazine, as otherwise the forward motion of the bolt will be stopped by coming in contact with the follower. In this case, care should be taken in drawing the bolt back, not to draw it from the receiver.

The absence of the bolt stop and sleeve lock does not affect the usefulness of the arm.

The absence of the floor plate, follower, and magazine spring only prevents the use of the magazine, but does not prohibit the use of the arm as a single-loader. The soldier should be taught to appreciate these facts.

REMARKS.

Complaints have not infrequently been received that a mainspring was too weak to perform its office, when the fault rested with the sol-

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dier, who in sighting inadvertently raised the bolt handle with his hand before pulling the trigger, and thus caused the force of the spring to be expended in closing the bolt, instead of in exploding the cartridge.

All cams and bearings should be kept slightly oiled to prevent wear.

When firing many successive rounds care must be taken that unburned grains of powder do not collect and pack in the locking lug recesses of the receiver, as this will interfere with the perfect closing of the bolt. Such accumulations can be blown out from time to time, or, when packed, removed by a knife or the screw-driver.

Except when repairs are needed, the following parts will constantly be injured if allowed to be dismounted by the soldier for cleaning; and when repairs are necessary, they should be removed only by a company artificer, or some one familiar with the handling of tools and delicate mechanisms, viz: Bolt stop, cut-off, safety lock, sleeve lock, front sight, lower band, and stacking swivel screws.

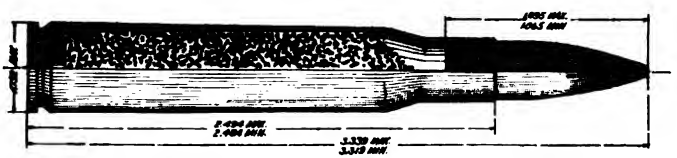
Unless the screw-driver is handled carefully, and with some skill, the screws are sure to be injured either at the head or thread.

AMMUNITION FOR U. S. MAGAZINE RIFLE, MODEL OF 1903.

BALL CARTRIDGE.

The CALIBER .30 BALL CARTRIDGE, Fig. 141, consists of the *case*, *primer*, *charge of smokeless powder*, and *bullet*. The case is of cartridge brass. It has a conical body joined by a sharper cone, called the shoulder, to the neck, which is the seat of the bullet and very nearly cylindrical. The front end of the case is called the mouth and the rear end the head. The head of case is grooved to provide for extraction of cartridge from the chamber of the rifle and is provided with a primer pocket and vent. The initials of the place of manufacture, the

Fig. 141.



number of the month, and the year of its fabrication are stamped on the head of case.

The primer consists of the *cup*, *percussion composition*, *disk of shellacked paper*, and *anvil*. The cup is of gilding metal and contains .48 grain of non-fulminate composition composed of tersulphide of antimony, potassium chlorate, sulphur and ground glass. A disc of shellacked paper covers the composition to protect it from moist-

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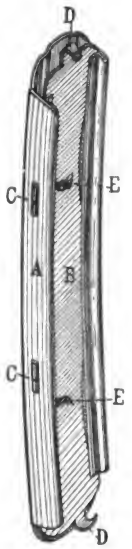
ure and to prevent electrolytic action. The anvil is of brass and is assembled over the paper. After the primer is assembled to the case a drop of shellac is placed on the head of the primer to make the joint waterproof.

The charge is of pyrocellulose composition very similar to the powders used as propelling charges in field and seacoast guns. The grains are cylindrical, single, perforated and graphited. The normal charge weighs from 48 to 50 grains, varying with the lot of powder used.

Fig 142.



The bullet has a core of lead and tin composition inclosed in a jacket of cupro nickel. It weighs 150 grains, and the point is much sharper and offers less resistance to the air than that of any previous model in the United States service. The sides of the bullet are smooth and its base flat. That portion of the sides of the bullet inclosed in the neck of the case is covered with a lubricant of japan wax and graphite. A pressure of at least 75 pounds is required to seat the bullet in the case, resulting in the case being waterproof.

The standard muzzle velocity of this ammunition in the rifle is 2,700 feet per second. The instrumental velocity measured at 78 feet from the muzzle is 2,640 feet per second, with an allowed mean variation of 20 feet per second on either side of the standard.

The cartridge complete weighs about 392 grains, its weight varying slightly with variation in the weight of the powder charge.

Five cartridges are packed in a clip.

The CLIP, Fig. 142, consists of the *body*, A, and the *spring*, B, both of brass. On the exterior of the sides of the body are the *stop lugs*, C, which seat the clip in its slots in the receiver of the rifle. The top edges of the slides are folded inward, forming flanges, which, fitting into the grooves in the heads, hold the cartridges in place. The spring is secured to the bottom of the body by two sets of *interlocking lips*, E. The spring is provided with narrow *tongues*, D, which, when the clip is filled, are pressed into the grooves of the outside cartridges, holding the cartridges securely in the clip. The clip body can be used a number of times, but the springs only once.

The clip for dummy cartridges has square instead of round ends and the tongues on spring are omitted.

Sixty ball cartridges in twelve clips are packed in a bandoleer.

The bandoleer is made of olive drab cloth and contains six pockets, each holding two clips.

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The mouth of each pocket is sewed up, but a piece of tape is sewed in in such a manner that by pulling on its end the seam is readily opened.

The bandoleer is provided with a shoulder strap of olive drab webbing by which it is carried over the shoulder, and a safety pin is provided to afford an adjustment of its length to suit the convenience of the soldier.

The bandoleer with cartridges weighs about 3.88 pounds. On each bandoleer is stamped the number and kind of cartridges, the place of manufacture, the instrumental velocity, and the date of loading.

Twelve hundred cartridges (in 20 bandoleers) are packed in an hermetically sealed zinc case provided with one end of tin soldered to the case. By means of a brass handle on the cover the latter is easily torn off.

The zinc case is inclosed in a wooden box of outer dimensions of 34.5 by 9.5 by 8.27 inches, which weighs, filled, about 99 pounds.

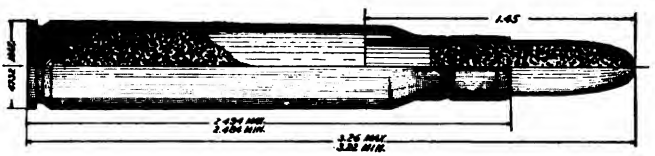
One end is held to the box by five brass bolts, and can be easily removed without the use of tools.

Two wire seals also connect the cover with the sides of the box. The date of loading of the contained cartridges is stamped on each end of the wooden box.

BLANK CARTRIDGE.

The BLANK CARTRIDGE, Fig. 143, differs from the ball cartridge in the charge of powder and in the bullet, and in the fact that the case is tinned. The bullet is of paper, hollow, and contains a charge of 5

Fig. 143.



grains of "E. C." smokeless powder, which insures the breaking up of the bullet on leaving the bore. This charge is retained in the bullet by a drop of shellac. A coating of paraffin on the outside of the bullet prevents the absorption of moisture by the paper. The propelling charge is 10 grains of "E. C." powder.

The cartridge is made 0.1 inch shorter than the ball cartridge. This is a measure of protection against the accidental assembling by the machine of a ball cartridge in a clip of blank ones.

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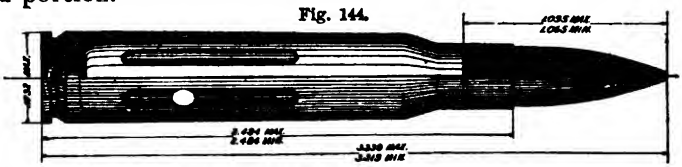
DUMMY CARTRIDGE.

The case of the DUMMY CARTRIDGE, Fig. 144, is tinned and provided with six longitudinal corrugations, also three circular holes in the corrugated portion.

Fig. 144.

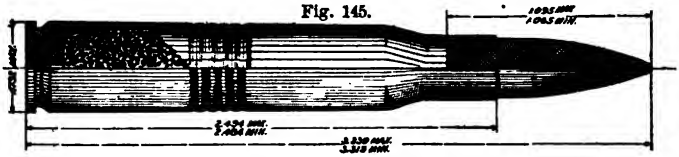


The tinning, corrugations, and holes afford unmistakable means for distinguishing the dummy from the ball cartridge, both by sight and touch. The bullet is the same as in the ball cartridge. The dummy primer has cup and anvil, but no percussion composition.

GUARD CARTRIDGE.

This cartridge, Fig. 145, differs from the ball cartridge in the charge of powder and in the fact that second class bullets having slight imperfections are used. Five cannelures encircle the body of the case at about the middle, affording means for distinguishing it from the ball cartridge by either sight or touch.

Fig. 145.



The charge, about 9.1 grains bullseye powder, or 16.7 grains Du Pont Rifle Smokeless No. 1, gives a muzzle velocity of 1,200 feet per second. This cartridge gives good results at 100 yards and has sufficient accuracy for use at 150 and 200 yards. The range of 100 yards requires a sight elevation of 450 yards, and ranges of 200 and 300 yards require elevations of 650 and 850 yards, respectively.

DESCRIPTION OF COLORS AND MARKINGS.

Adopted for the pasteboard and wooden boxes in which the different kinds of model of 1906 caliber .30 ammunition are issued.

Kind of ammunition.	Label on pasteboard box.		Wooden packing box.	
	Color.	Markings.	Markings.	
*Ball cartridge		Number, kind, caliber, model, place of manufacture, cautions, and information are printed in black ink on the bandoleer or label.	Red band 4 in. wide around middle of length, and on full length of handles, of box. Band 4 in. wide, of same color as label, around one end, and along half the length of handles, of box.	On both sides of box, the number, kind, model, caliber, kind of powder, and place of manufacture; on both ends of box the model and caliber; and on cover the ordnance insignia—all in black ink in large letters and figures.
Blank cartridge	Blue			
Dummy cartridge	Green			
Gallery practice cartridge	Brown			
Guard cartridge	Orange			

*The ball cartridges are packed in bandoleers instead of paper boxes.

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REMARKS.

Experimental firing and laboratory experiments show that, all other conditions being identical, the muzzle velocity of ammunition loaded with smokeless powder will be increased by exposure to a higher atmospheric temperature, and decreased by a lower. Variations in the barometric pressure and the percentage of humidity of the air will also cause variations in the velocity. Consequently the elevation for any range will vary slightly with these conditions. Moreover, the velocity at 78 feet stamped upon the bandoleers may vary, in different issues of ammunition, 20 feet on either side of the standards. The muzzle velocity obtained in different rifles also varies with the same ammunition.

In adjusting the sight for elevation at any range, it must be borne in mind that, in addition to the allowance made for variations in the velocity of the ammunition, allowance must also be made for the effect of differences in light, the amount of front sight seen, the effect of mirage on the target, the effect of heat developed in the gun in firing, the condition of the bore as to cleanliness, the personal equation of the firer, the peculiarities of individual guns, etc.

The graduations of the rear sight are correct only for the particular conditions existing when they were experimentally determined, consequently, in adjusting the sight for elevation at any range, allowance must be made for whatever change in the elevation the difference between the former and the present conditions produces.

EXTERIOR BALLISTICS.

RAPIDITY OF FIRE.

Twenty-three aimed shots have been fired in one minute with this rifle, used as a single-loader, and twenty-five shots in the same time, using magazine fire.

Firing from the hip without aim, twenty-seven shots have been fired in one minute, using rifle as a single-loader, and thirty-five shots in one minute, using magazine fire.

MAXIMUM RANGE.

(Computed.)

Maximum range.	Elevation.	Time of flight.
5,465 yards.	45 degrees.	31.36 seconds.

PRESSURE.

The powder pressure in the chamber of this rifle is about 49,000 pounds per square inch.

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RECOIL.

(Computed.)

The maximum energy of free recoil of this rifle is 14.98 foot pounds.

ACCURACY.

(As determined by firings to date.)

Range.	Deviation.		
	Mean vertical.	Mean horizontal.	Mean absolute.
Yards.	*Inches.*	*Inches.*	*Inches.*
100	0.8	0.8	1.1
200	1.6	1.6	2.3
300	2.4	2.4	3.4
400	3.3	3.3	4.7
500	4.2	4.2	5.9
600	5.1	5.1	7.2
700	6.0	6.1	8.7
800	7.0	7.2	10.0
900	7.9	8.5	11.6
1,000	8.9	9.9	13.3
1,100	10.0	11.4	15.2
1,200	11.2	13.2	17.3
1,300	12.5	15.0	19.5
1,400	13.9	17.3	22.2
1,500	15.5	19.4	24.8
1,600	17.0	21.6	27.5
1,700	18.6	23.8	30.2
1,800	20.1	26.0	32.9
1,900	22.0	28.2	35.8
2,000	23.7	30.4	38.5

PENETRATION.

Material.	Penetration.			
	50 feet.	100 yards.	500 yards.	1,000 yards.
	Inches.	*Inches.*	*Inches.*	*Inches.*
White-pine butts, made of 1-inch boards placed 1 inch apart	33.5	46.7	24.3	12.8
Moist sand	8.7	.....	13.4	12.5
Dry sand	4.	.....	9.2	7.5
Loam practically free from sand	14.	.....	18.8	18.6
Low steel plate, .493 inch thick	.446	.259	.....	.....
Low steel plate, .3843 inch thick	Through.	Through.	.....	.....
Low steel plate, .3062 inch thick	Through.	Through.	.....	.....
High steel plate, .3848 inch thick	Through.	2.41	.....	.....
High steel plate, .1962 inch thick	Through.	Through.	.....	.....
Thoroughly seasoned oak, across the grain	12.2	33.6	.....	.....
Brick wall	.....	5.0	.....	.....

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POINT-BLANK DANGER SPACE.

Position.	Assumed height of line of sight above ground.	Point-blank danger space (computed).
	Inches.	*Yards.*
Firing standing	56	718.6
Firing kneeling	30	629.4
Firing lying down	12	589.7

NOTE.—Above computations and firings based upon battle sight, leaf down, which corresponds to an angle of departure of 17′ 57″.

The computed point-blank danger spaces for the different firing positions, considering axis of barrel horizontal, are 400, 307.3, and 204.79 yards, respectively.

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TABLE OF FIRE FOR U. S. MAGAZINE RIFLE, MODEL OF 1903, MODEL OF 1905 SIGHT, AND 1906 AMMUNITION.

Initial velocity=2,700 feet per second. C=.3894075, determined experimentally at Frankford Arsenal.

Range.	Angle of departure. (Computed.)		Angle of elevation. (Verified by firing.)		Time of flight. (Computed.)	Angle of fall. (Computed.)		Remaining velocity. (Computed.)	Remaining energy. (Computed.)	Summit of trajectory. (Computed.)	
										Height.	Distance from muzzle.
Yards.	*Deg.*	*Min.*	*Deg.*	*Min.*	*Seconds.*	*Deg.*	*Min.*	*Feet per second.*	*Foot-pounds.*	*Feet.*	*Yards.*
100	0	2.424	0	2.40	.116	0	2.576	2,465.09	2,024.47	.055	50.9
200	0	5.153	0	5.18	.244	0	5.828	2,244.75	1,678.74	.241	103.8
300	0	8.275	0	8.26	.384	0	12.196	2,038.58	1,384.53	.595	157.5
400	0	11.833	0	11.83	.539	0	14.594	1,846.02	1,136.32	1.168	212.4
500	0	15.918	0	15.90	.709	0	21.937	1,668.16	927.09	2.035	270.5
600	0	20.651	0	20.68	.899	0	30.436	1,507.32	756.93	3.273	329.5
700	0	26.105	0	26.15	1.108	0	41.104	1,362.04	618.05	4.989	390.1
800	0	32.441	0	32.50	1.341	0	54.543	1,237.75	510.40	7.314	452.2
900	0	39.782	0	39.86	1.593	1	10.819	1,140.71	433.50	10.435	516.1
1,000	0	48.199	0	48.30	1.865	1	29.691	1,068.31	380.23	14.480	580.7
1,100	0	57.732	0	57.80	2.155	1	50.924	1,011.38	340.78	19.556	643.7
1,200	1	8.379	1	8.55	2.458	2	14.311	964.91	310.18	25.847	706.6
1,300	1	20.132	1	20.35	2.776	2	39.763	924.14	284.52	33.397	767.4
1,400	1	32.990	1	33.25	3.108	3	7.422	886.67	261.92	42.335	826.8
1,500	1	46.953	1	47.26	3.453	3	37.359	852.12	241.91	52.770	885.3
1,600	2	2.039	2	2.38	3.813	4	9.746	820.16	229.11	64.840	943.2
1,700	2	18.271	2	18.68	4.187	4	44.618	790.52	208.19	78.629	1,000.9
1,800	2	35.667	2	36.12	4.574	5	22.246	762.54	193.72	94.262	1,058.5
1,900	2	54.277	2	54.90	4.977	6	2.751	735.56	180.25	112.527	1,118.3
2,000	3	14.110	3	14.70	5.394	6	46.362	709.54	167.72	131.765	1,174.5
2,100	3	35.251			5.827	7	33.416	684.43	156.06	153.990	1,233.2
2,200	3	57.752			6.270	8	23.720	660.21	145.21	178.850	1,292.5
2,300	4	21.567			6.721	9	17.025	636.85	135.12	206.412	1,352.2
2,400	4	46.748			7.180	10	13.652	614.31	125.73	236.814	1,411.8
2,500	5	13.324			7.646	11	16.429	592.58	116.99	270.360	1,470.4
2,600	5	41.322			8.115	12	16.381	571.61	108.85	307.200	1,531.9

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2,700	6	10.723	----------	8.518	13	22.686	---	551.38	---	101.28	---	347.478	---	1,592.0
2,800	6	41.546	----------	9.006	14	32.053	---	531.87	---	94.24	---	391.002	---	1,652.4
2,900	7	14.264	----------	9.500	15	45.268	---	513.05	---	87.69	---	439.574	---	1,714.0
3,000	7	48.858	----------	9.999	17	2.369	---	494.89	---	81.59	---	493.594	---	1,776.8
3,100	8	25.339	----------	10.503	18	23.300	---	477.39	---	75.92	---	551.804	---	1,840.8
*5,465.8	45	0.000	----------	31.359	68	24.510	---	203.57	---	13.81	---	6,844.220	---	3,432.4

*Extreme range.

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ORDINATES OF TRAJECTORY ABOVE LINE OF SIGHT.

(Computed.)

Horizontal distance.	100 yards.	200 yards.	300 yards.	400 yards.	500 yards.	600 yards.	700 yards.	800 yards.	900 yards.	1,000 yards.
Yards.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
100	0									
200	.238	0								
300	.510	.545	0							
400	.821	1.165	.931	0						
500	1.177	1.879	2.001	1.426	0					
600	1.590	2.705	3.240	3.078	2.065	0				
700	2.066	3.656	4.668	4.982	4.444	2.855	0			
800	2.619	4.763	6.326	7.194	7.209	6.173	3.870	0		
900	3.260	6.045	8.250	9.758	10.414	10.114	8.357	5.128	0	
1,000	3.994	7.513	10.452	12.695	14.085	14.423	13.469	11.000	6.605	0
1,100	4.827	9.117	12.948	16.028	18.245	19.415	19.319	17.655	14.092	8.317
1,200	5.756	11.036	15.736	19.740	22.891	24.991	25.824	25.088	22.454	17.608
1,300	6.782	13.088	18.814	23.844	28.021	31.146	33.000	33.294	31.683	27.862
1,400	7.905	15.334	22.183	28.335	33.634	37.881	40.861	42.272	41.783	39.082
1,500	9.124	17.772	25.841	33.212	39.730	45.195	49.394	52.023	52.751	51.267
1,600	10.442	20.408	29.794	38.482	46.318	53.100	58.615	62.560	64.604	64.435
1,700	11.861	23.245	34.049	44.155	53.408	61.607	68.539	73.900	77.360	78.605
1,800	13.382	26.286	38.611	50.237	61.009	70.728	79.178	86.057	91.034	93.789
1,900	15.009	29.541	43.493	56.746	69.144	80.489	90.564	99.068	105.667	110.051
2,000	16.745	33.012	48.698	63.686	77.819	90.897	102.232	112.940	121.270	127.383
2,100	18.597	36.714	54.251	71.089	87.071	101.997	115.652	127.734	137.907	145.866
2,200	20.574	40.658	60.166	78.974	96.998	113.820	129.444	143.493	155.600	165.552
2,300	22.657	44.836	66.431	87.327	107.365	126.345	144.052	160.183	174.404	186.401
2,400	24.868	49.257	73.064	96.168	118.414	139.602	159.514	177.848	194.271	208.467
2,500	27.205	53.930	80.071	105.510	130.090	153.609	175.852	196.513	215.261	231.779
2,600	29.670	58.860	87.465	115.366	142.406	168.386	193.118	216.203	237.402	256.380
2,700	32.263	64.045	95.241	125.732	155.361	183.926	211.211	236.910	260.686	282.228
2,800	34.987	69.492	103.403	136.620	168.967	200.249	230.247	258.655	285.140	309.382
2,900	37.884	75.285	112.090	148.202	183.440	217.610	250.490	281.785	311.150	338.260
3,000	40.955	81.426	121.316	160.477	198.780	236.011	271.952	306.297	338.707	368.864
3,100	44.203	87.920	131.040	173.460	215.000	255.470	294.640	322.215	367.843	401.218

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Horizontal distance.	1,100 yards.	1,200 yards.	1,300 yards.	1,400 yards.	1,500 yards.	1,600 yards.	1,700 yards.	1,800 yards.	1,900 yards.	2,000 yards.
Yards.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
100										
200										
300										
400										
500										
600										
700										
800										
900										
1,000										
1,100	0									
1,200	10.218	0								
1,300	21.496	12.302	0							
1,400	33.836	25.822	14.579	0						
1,500	47.238	40.380	30.411	17.046	0					
1,600	61.720	56.175	47.519	35.465	19.729	0				
1,700	77.304	73.172	65.927	55.284	40.957	22.634	0			
1,800	94.010	91.391	85.659	76.527	63.709	46.895	25.766	0		
1,900	111.886	110.887	106.770	99.256	88.052	72.851	53.331	29.172	0	
2,000	130.945	131.672	129.281	123.486	114.002	100.517	81.712	60.265	32.801	0
2,100	151.270	153.836	153.284	149.321	141.671	130.014	114.035	93.410	67.765	36.78
2,200	172.916	177.440	178.842	176.836	171.132	161.422	147.385	128.698	104.986	75.93
2,300	195.841	202.438	205.910	205.970	202.328	194.677	182.696	166.057	144.390	117.372
2,400	220.103	228.893	234.553	236.760	235.337	229.860	220.048	205.576	186.068	161.204
2,500	245.734	256.838	264.810	269.360	270.200	267.020	259.497	247.308	230.077	207.482
2,600	272.768	286.313	296.720	303.700	306.965	306.202	301.091	291.306	276.471	256.264
2,700	301.196	317.305	330.271	339.803	345.615	347.390	344.810	337.549	325.230	307.524
2,800	331.047	349.847	365.805	377.707	386.189	390.627	390.700	386.081	376.394	361.313
2,900	362.790	384.450	402.950	418.010	429.328	436.590	439.479	437.660	430.770	418.470
3,000	396.431	421.119	442.640	460.705	475.023	485.276	491.144	492.298	488.353	478.990
3,100	431.990	459.880	484.590	505.830	523.320	536.730	545.740	550.010	549.180	542.910

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ORDINATES OF TRAJECTORY ABOVE LINE OF SIGHT—Continued.

Horizontal distance.	2,100 yards.	2,200 yards.	2,300 yards.	2,400 yards.	2,500 yards.	2,600 yards.	2,700 yards.	2,800 yards.	2,900 yards.	3,000 yards.	3,100 yards.
Yards.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1,300											
1,400											
1,500											
1,600											
1,700											
1,800											
1,900											
2,000											
2,100	0										
2,200	41.075	0									
2,300	84.549	45.501	0								
2,400	130.528	93.619	50.249	0							
2,500	179.068	144.420	103.286	55.273	0						
2,600	230.228	197.941	159.174	113.508	60.571	0					
2,700	283.982	254.178	217.882	174.676	124.186	66.046	0				
2,800	340.382	313.170	279.465	238.829	190.895	135.295	71.774	0			
2,900	400.310	375.850	344.880	306.960	261.730	208.820	147.970	78.845	0		
3,000	463.748	441.344	414.114	379.068	336.689	286.605	228.559	162.221	86.136	0	
3,100	530.740	512.260	487.210	455.180	415.800	368.690	313.580	250.170	176.980	93.705	0

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DANGEROUS SPACES.

The dangerous spaces were calculated under the assumption that the gun, when fired, is 12 inches above the ground, that the height of a man is 68 inches, that the head of a man on horseback is 8 feet above the ground, and that the gun is aimed at the middle point of the target.

Rifle against infantry and cavalry.

Distance to target.	Rising branch of trajectory.		Falling branch of trajectory.				Continuous dangerous space at target.		Total.	
			In front of target.		In rear of target.					
	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*
100	All.	All.	All.	All.	580.9	171.6+196.7	680.9	271.6	680.9	468.3
200	All.	All.	All.	All.	347.3	466.5	547.3	666.5	547.3	666.5
300	All.	All.	All.	All.	240.4	376.8	540.4	676.8	540.4	676.8
400	All.	All.	All.	All.	172.9	233.7	572.9	633.7	572.9	633.7
500	All.	All.	All.	All.	128.3	170.5	628.3	670.5	628.3	670.5
600	All.	All.	All.	All.	96.7	131.9	696.7	731.9	696.7	731.9
700	235.0	All.	113.2	All.	72.6	101.5	185.8	801.5	420.8	801.5
800	172.2	273.6	73.3	120.3	56.3	79.9	129.6	200.2	301.8	473.8
900	138.2	210.2	51.3	80.9	44.2	61.5	95.5	142.4	233.7	352.6
1,000	112.4	167.2	39.6	58.9	35.2	49.2	74.8	108.1	187.2	275.3
1,100	93.5	138.8	33.2	45.6	26.9	40.1	60.1	85.7	153.6	224.5
1,200	78.3	117.3	25.3	36.7	23.6	33.4	48.9	70.1	127.2	187.4
1,300	66.6	100.0	21.0	34.4	20.1	28.2	41.1	62.6	107.7	162.6
1,400	57.5	85.8	17.8	25.5	17.1	24.1	34.9	49.6	92.4	135.4
1,500	49.9	74.6	15.3	21.7	14.8	20.8	30.1	42.5	80.0	117.1
1,600	43.7	65.4	13.4	18.8	13.0	18.1	26.4	36.9	70.1	102.3
1,700	38.6	57.7	11.6	16.4	11.2	15.9	22.8	32.3	61.4	90.0
1,800	34.2	51.2	10.2	14.2	9.9	13.9	20.1	28.1	54.3	79.3
1,900	30.8	45.8	9.1	13.0	8.9	12.6	18.0	25.6	48.8	71.4
2,000	27.5	41.1	8.0	11.4	7.8	11.1	15.8	22.5	43.3	63.6
2,100	24.7	37.1	7.2	10.2	7.0	9.9	14.2	20.1	38.9	57.2
2,200	22.5	33.6	6.5	9.1	6.3	8.6	12.8	17.7	35.3	51.3
2,300	20.4	30.5	5.9	8.3	5.7	7.9	11.6	16.2	32.0	46.7
2,400	18.5	27.8	5.3	7.5	5.2	7.2	10.5	14.7	29.0	42.5

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DANGEROUS SPACES—Continued.

Rifle against infantry and cavalry—Continued.

Distance to target.	Rising branch of trajectory.		Falling branch of trajectory.				Continuous dangerous space at target.		Total.	
			In front of target.		In rear of target.					
	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.
Yards	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*
2,500	17.0	25.7	4.8	7.0	4.7	6.7	9.5	13.7	26.5	39.4
2,600	15.6	23.5	4.6	6.5	4.4	6.0	9.0	12.5	24.6	36.0
2,700	14.7	21.6	4.2	6.0	4.0	5.5	8.2	11.5	22.9	33.1
2,800	13.4	20.0	3.8	5.3	3.5	5.0	7.3	10.3	20.7	30.3
2,900	12.3	18.4	3.5	5.0	3.3	4.6	6.8	9.6	19.1	28.0
3,000	11.0	16.8	3.0	4.5	3.0	4.4	6.0	8.9	17.0	25.7
3,100	10.3	15.5	2.8	4.1	2.7	4.0	5.5	8.1	15.8	23.6

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HORIZONTAL DEVIATION.

The rifle has a right-hand twist, and the drift proper is, therefore, to the right. There is, however, a slight lateral jump to the left, and the total horizontal deviation of the bullet, excluding wind, is the algebraic sum of the drift and the lateral jump. The trajectory is found to be very slightly to the left of the central or uncorrected line of sight up to a range of 500 yards, and beyond that range to the right of this line. In order to minimize the deviations at the most important ranges, the drift slot on the sight leaf is so cut as to make the trajectory cross the adjusted line of sight at a range of 500 yards. The deviations under these conditions are shown in column (4) of the table below.

This drift and the deviations due to wind, given below, have been determined by experimental firings, up to 2,000 yards.

Range.	Drift with targeted rifles, model of 1905 sights graduated for 1906 ammunition.			Deviation at target produced by a 1-mile wind normal to the plane of fire.
	Total drift.	Drift corrected by sight leaf.	Drift uncorrected.	
(1)	(2)	(3)	(4)	(5)
Yards.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
	Left.	Left.		
100	0.26	0.26	0.0	0.1
200	0.42	0.42	0.0	0.3
300	0.45	0.45	0.0	0.8
400	0.32	0.32	0.0	1.5
500	0.0	0.0	0.0	2.4
	Right.	Right.		
600	0.55	0.55	0.0	3.6
			Right.	
700	2.0	1.4	0.6	5.1
800	4.5	2.6	1.9	6.9
900	8.2	4.2	4.0	9.1
1,000	13.0	6.3	6.7	11.5
1,100	20.5	9.0	11.5	14.3
1,200	29.3	12.3	17.0	17.2
1,300	40.0	16.3	23.7	20.4
1,400	50.7	21.1	29.6	23.8
1,500	61.75	26.75	35.0	27.4
1,600	74.8	33.3	41.5	31.2
1,700	90.0	40.8	49.2	35.2
1,800	107.0	49.3	57.7	39.4
1,900	126.5	59.1	67.4	43.9
2,000	149.5	69.9	78.6	48.6
2,100	174.5	82.1	92.4	53.5
2,200	202.0	95.6	106.4	58.6
2,300	232.0	110.4	121.6	63.8
2,400	264.0	126.7	137.3	69.1
2,500	301.0	145.3	155.7	74.6
2,600	339.0	165.4	173.6	80.0
2,700	381.0	188.1	192.9	84.5
2,800	428.0	212.8	215.2	90.3
2,850	456.0	226.3	229.7	93.2

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CORRECTIONS CORRESPONDING TO ONE POINT OF THE DEFLECTION SCALE AND TO A CHANGE IN ELEVATION OF 25 YARDS.

Range.	Correction caused by moving the eyepiece one point.	Correction corresponding to a change in elevation of 25 yards.	Range.	Correction caused by moving the eyepiece one point.	Correction corresponding to a change in elevation of 25 yards.
Yards.	*Inches.*	*Inches.*	*Yards.*	*Inches.*	*Inches.*
100	3.99	0.72	1,600	63.96	68.38
200	7.99	1.62	1,700	67.96	77.76
300	11.99	2.79	1,800	71.96	88.23
400	15.99	4.29	1,900	75.95	99.24
500	19.99	6.22	2,000	79.95	111.05
600	23.98	8.59	2,100	83.95	123.56
700	27.98	11.64	2,200	87.95	136.92
800	31.98	15.43	2,300	91.94	151.09
900	35.98	19.92	2,400	95.94	166.16
1,000	39.97	25.08	2,500	99.94	182.05
1,100	43.97	30.78	2,600	103.94	198.76
1,200	47.97	37.09	2,700	107.94	216.29
1,300	51.97	43.93	2,800	111.93	234.64
1,400	55.96	51.41	2,900	115.93	253.81
1,500	59.66	59.43	3,000	119.93	273.80

TABLE SHOWING NUMBER OF POINTS OF DEFLECTION OR WINDAGE NECESSARY TO CORRECT FOR A TEN-MILE-AN-HOUR WIND.

(Computed.)

Range.	Direction of Wind.											
	XII.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
Yards.	To right.						To left.					
100	.0	.1	.2	.2	.2	.1	.0	.1	.2	.2	.2	.1
200	.0	.2	.4	.4	.4	.2	.0	.2	.4	.4	.4	.2
300	.0	.3	.6	.7	.6	.3	.0	.3	.6	.7	.6	.3
400	.0	.5	.8	.9	.8	.5	.0	.5	.8	.9	.8	.5
500	.0	.6	1.0	1.2	1.0	.6	.0	.6	1.0	1.2	1.0	.6
600	.0	.7	1.3	1.5	1.3	.7	.0	.7	1.3	1.5	1.3	.7
700	.0	.9	1.6	1.8	1.6	.9	.0	.9	1.6	1.8	1.6	.9
800	.0	1.1	1.9	2.2	1.9	1.1	.0	1.1	1.9	2.2	1.9	1.1
900	.0	1.3	2.2	2.5	2.2	1.3	.0	1.3	2.2	2.5	2.2	1.3
1,000	.0	1.4	2.4	2.8	2.4	1.4	.0	1.4	2.4	2.8	2.4	1.4
1,100	.0	1.6	2.8	3.3	2.8	1.6	.0	1.6	2.8	3.3	2.8	1.6
1,200	.0	1.8	3.1	3.6	3.1	1.8	.0	1.8	3.1	3.6	3.1	1.8
1,300	.0	2.0	3.4	3.9	3.4	2.0	.0	2.0	3.4	3.9	3.4	2.0
1,400	.0	2.1	3.7	4.3	3.7	2.1	.0	2.1	3.7	4.3	3.7	2.1
1,500	.0	2.3	4.0	4.6	4.0	2.3	.0	2.3	4.0	4.6	4.0	2.3
1,600	.0	2.4	4.2	4.9	4.2	2.4	.0	2.4	4.2	4.9	4.2	2.4
1,700	.0	2.6	4.5	5.2	4.5	2.6	.0	2.6	4.5	5.2	4.5	2.6
1,800	.0	2.7	4.8	5.5	4.8	2.7	.0	2.7	4.8	5.5	4.8	2.7
1,900	.0	2.9	5.0	5.8	5.0	2.9	.0	2.9	5.0	5.8	5.0	2.9
2,000	.0	3.0	5.3	6.1	5.3	3.0	.0	3.0	5.3	6.1	5.3	3.0
2,100	.0	3.2	5.5	6.4	5.5	3.2	.0	3.2	5.5	6.4	5.5	3.2
2,200	.0	3.3	5.8	6.7	5.8	3.3	.0	3.3	5.8	6.7	5.8	3.3
2,300	.0	3.5	6.0	6.9	6.0	3.5	.0	3.5	6.0	6.9	6.0	3.5
2,400	.0	3.6	6.2	7.2	6.2	3.6	.0	3.6	6.2	7.2	6.2	3.6
2,500	.0	3.7	6.5	7.5	6.5	3.7	.0	3.7	6.5	7.5	6.5	3.7
2,600	.0	3.8	6.7	7.7	6.7	3.8	.0	3.8	6.7	7.7	6.7	3.8
2,700	.0	3.9	6.8	7.8	6.8	3.9	.0	3.9	6.8	7.8	6.8	3.9
2,800	.0	4.0	7.0	8.1	7.0	4.0	.0	4.0	7.0	8.1	7.0	4.0
2,900	.0	4.1	7.2	8.3	7.2	4.1	.0	4.1	7.2	8.3	7.2	4.1
3,000	.0	4.3	7.4	8.5	7.4	4.3	.0	4.3	7.4	8.5	7.4	4.3

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LONGITUDINAL WIND COMPONENTS FOR MODEL OF 1903 RIFLE, 1905 SIGHT, 1906 AMMUNITION—CALCULATED.

Wind velocities.....	5 miles per hour.						10 miles per hour.					
Direction of wind...	VI.	XII.	VI.		XII.		VI.	XII.	VI.		XII.	
Variation at target..	$+\Delta X$	$-\Delta X$	$+\Delta Y$		$-\Delta Y$		$+\Delta X$	$-\Delta X$	$+\Delta Y$		$-\Delta Y$	
Range in yards:	*Yards.*	*Yards.*	*Ft.*	*In.*	*Ft.*	*In.*	*Yards.*	*Yards.*	*Ft.*	*In.*	*Ft.*	*In.*
100.....	0.48	0.47	0	0.013	0	0.012	0.97	0.92	0	0.03	0	0.02
200.....	1.00	1.00	0	.061	0	.060	2.03	2.00	0	.12	0	.11
300.....	1.59	1.59	0	.203	0	.203	3.22	3.15	0	.41	0	.40
400.....	2.25	2.23	0	.344	0	.343	4.50	4.40	0	.69	0	.68
500.....	3.06	3.04	0	.702	0	.700	6.1	6.04	0	1.4	0	1.3
600.....	3.99	3.95	0	1.27	0	1.26	8.0	7.9	0	2.5	0	2.4
700.....	5.08	5.02	0	2.19	0	2.16	10.2	9.9	0	4.4	0	4.3
800.....	6.80	6.69	0	3.88	0	3.82	13.6	13.3	0	7.8	0	7.6
900.....	9.85	9.61	0	7.30	0	7.12	19.9	19.	1	2.7	1	2.1
1,000.....	13.23	12.91	1	.42	1	.13	26.7	25.5	2	1.1	1	11.9
1,100.....	16.80	16.39	1	7.52	1	7.04	34.0	33.0	3	3.5	3	2.5
1,200.....	20.34	20.03	2	4.62	2	4.19	40.9	39.6	4	9.6	4	7.7
1,300.....	22.67	22.39	3	1.96	3	1.50	45.6	44.5	6	4.4	6	2.4
1,400.....	25.14	24.77	4	1.40	4	.70	50.6	49.3	8	3.6	8	.8
1,500.....	27.69	27.32	5	3.11	5	2.3	55.7	54.3	10	7.0	10	3.7
1,600.....	30.36	29.94	6	7.50	6	6.4	61.1	59.4	13	4.1	12	11.7
1,700.....	33.03	32.63	8	2.6	8	1.4	66.3	64.7	16	6.2	16	1.4
1,800.....	34.98	34.59	9	10.4	9	9.0	70.2	69.1	19	9.6	19	.5
1,900.....	36.93	36.68	11	8.8	11	7.8	74.1	73.1	23	6.6	23	2.6
2,000.....	38.97	38.72	13	10.6	13	9.5	77.1	77.0	27	9.3	27	9.2
2,100.....	41.15	40.79	16	4.5	16	2.8	82.5	81.2	32	10.1	32	3.9
2,200.....	43.28	42.94	19	2.0	19	1.4	86.9	85.5	38	5.8	37	10.5
2,300.....	45.54	45.17	22	4.0	22	1.8	91.5	90.0	44	10.2	44	1.5
2,400.....	47.83	47.45	25	10.7	25	8.2	96.1	94.5	52	0.4	51	1.9
2,500.....	50.20	49.78	30	.2	29	9.3	100.8	99.2	60	3.7	59	3.6
2,600.....	52.65	52.18	34	4.3	34	0.6	105.6	103.9	68	11.0	67	10.0
2,700.....	54.98	54.47	39	2.8	38	10.4	110.4	108.4	78	9.4	77	4.5
2,800.....	57.53	56.95	44	8.9	44	3.5	115.6	113.5	89	10.7	88	3.0
2,900.....	60.15	59.53	50	10.8	50	4.6	121.6	118.6	102	10.6	100	4.1
3,000.....	62.82	62.22	57	8.1	57	2.5	126.3	123.8	116	1.6	113	1.0

$+\Delta X$=yards short at target on horizontal plane.
$-\Delta X$=yards over at target on horizontal plane.
$+\Delta Y$=distance above at target in vertical plane.
$-\Delta Y$=distance below at target in vertical plane.

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LONGITUDINAL WIND COMPONENTS FOR MODEL OF 1903 RIFLE, 1905 SIGHT, 1906 AMMUNITION—CALCULATED—Continued.

Wind velocities.....	15 miles per hour.						20 miles per hour.					
Direction of wind...	VI.	XII.	VI.		XII.		VI.	XII.	VI.		XII.	
Variation at target..	$+\Delta X$	$-\Delta X$	$+\Delta Y$		$-\Delta Y$		$+\Delta X$	$-\Delta X$	$+\Delta Y$		ΔY	
Range in yards:	*Yards.*	*Yards.*	*Ft.*	*In.*	*Ft.*	*In.*	*Yards.*	*Yards.*	*Ft.*	*In.*	*Ft.*	*In.*
100.....	1.41	1.40	0	0.04	0	0.037	1.9	1.8	0	0.05	0	0.05
200.....	3.02	3.00	0	.18	0	.18	4.0	3.9	0	.20	0	.20
300.....	4.76	4.72	0	.61	0	.60	6.4	6.3	0	.80	0	.80
400.....	6.80	6.60	0	1.05	0	1.02	8.9	8.8	0	1.4	0	1.3
500.....	9.20	9.03	0	2.10	0	2.07	12.2	12.0	0	2.8	0	2.7
600.....	12.0	11.8	0	3.84	0	3.75	16.0	15.7	0	5.1	0	5.0
700.....	15.3	14.9	0	6.6	0	6.4	20.6	19.8	0	8.7	0	8.0
800.....	20.6	19.9	0	11.8	0	11.3	27.8	26.3	1	3.8	1	3.0
900.....	30.2	28.2	1	10.0	1	9.0	40.8	37.2	2	6.2	2	3.6
1,000.....	40.6	37.8	3	2.2	2	11.5	54.8	49.8	4	3.4	3	10.8
1,100.....	51.7	47.9	5	.1	4	7.7	69.8	63.2	6	9.0	6	1.4
1,200.....	61.3	58.6	8	11.9	6	10.5	82.9	77.2	9	8.7	9	0.6
1,300.....	68.9	66.3	9	7.4	9	3.0	92.6	87.8	12	11.0	12	3.0
1,400.....	76.4	73.4	12	6.2	12	.2	102.6	97.2	16	9.6	15	10.0
1,500.....	84.2	80.8	15	11.9	18	4.3	113.1	107.0	21	2.7	20	3.9
1,600.....	93.5	88.5	20	5.0	19	4.0	124.0	117.2	27	.9	25	7.2
1,700.....	99.6	96.5	24	9.6	24	.2	133.7	127.8	33	3.4	31	9.7
1,800.....	105.7	103.4	29	9.6	29	2.0	141.5	137.3	39	10.9	38	8.8
1,900.....	111.7	109.2	35	5.8	34	8.5	149.4	145.1	47	5.8	46	1.3
2,000.....	117.8	115.2	41	11.0	41	.7	157.7	153.1	56	2.4	54	6.5
2,100.....	124.3	121.4	49	6.0	48	4.0	166.4	161.3	66	2.8	64	2.4
2,200.....	130.9	127.9	57	11.6	56	7.4	175.3	169.8	77	7.8	75	2.4
2,300.....	137.7	134.5	67	6.6	65	11.3	184.4	178.6	90	5.3	87	6.9
2,400.....	144.8	141.2	78	6.5	76	5.1	193.8	187.6	104	11.0	101	6.0
2,500.....	151.9	148.2	90	10.0	88	7.2	203.5	196.7	121	8.4	117	8.0
2,600.....	159.3	155.2	103	11.6	101	3.8	213.4	206.1	139	3.2	134	6.4
2,700.....	166.4	161.9	118	8.5	115	6.7	222.9	215.0	159	.4	153	4.9
2,800.....	174.2	169.4	135	5.7	131	9.5	233.4	224.9	181	6.0	174	11.2
2,900.....	182.2	177.6	154	2.4	150	3.2	244.1	235.1	206	7.4	198	11.4
3,000.....	189.2	184.7	174	.1	169	9.7	255.2	245.4	234	8.4	225	8.4

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LONGITUDINAL WIND COMPONENTS FOR MODEL OF 1903 RIFLE, 1905 SIGHT, 1906 AMMUNITION—CALCULATED—Continued.

Wind velocities.....	25 miles per hour.						30 miles per hour.					
Direction of wind...	VI.	XII.	VI.		XII.		VI.	XII.	VI.		XII.	
Variation at target..	$+\Delta X$	$-\Delta X$	$+\Delta Y$		$-\Delta Y$		$+\Delta X$	$-\Delta X$	$+\Delta Y$		$-\Delta Y$	
Range in yards:	*Yards.*	*Yards.*	*Ft.*	*In.*	*Ft.*	*In.*	*Yards.*	*Yards.*	*Ft.*	*In.*	*Ft.*	*In.*
100.....	2.4	2.3	0	0.064	0	0.063	2.8	2.7	0	0.08	0	0.07
200.....	5.0	4.5	0	.31	0	.27	6.0	5.9	0	.40	0	.36
300.....	8.0	7.8	0	1.03	0	1.00	9.6	9.4	0	1.22	0	1.2
400.....	11.2	11.0	0	1.7	0	1.68	13.5	13.3	0	2.10	0	2.0
500.....	15.4	15.0	0	3.53	0	3.44	18.4	17.9	0	4.20	0	4.1
600.....	20.0	19.6	0	6.39	0	6.23	24.1	23.4	0	7.70	0	7.5
700.....	25.8	24.6	0	11.14	0	10.61	31.2	29.5	1	1.4	1	.7
800.....	35.2	32.8	1	8.1	1	6.7	42.7	37.8	2	0.4	1	9.6
900.....	51.6	46.0	3	2.3	2	10.1	62.7	54.6	3	10.5	3	4.5
1,000.....	69.4	61.6	5	5.2	4	9.8	84.3	73.1	6	7.2	5	8.7
1,100.....	88.4	78.1	8	6.7	7	5.7	107.5	92.6	10	4.9	8	11.6
1,200.....	104.3	95.3	12	2.8	11	2.2	126.1	113.0	14	9.4	13	3.1
1,300.....	116.4	109.1	16	3.0	15	2.6	140.7	130.1	19	7.6	18	1.8
1,400.....	129.1	120.8	21	1.7	19	9.3	156.0	144.1	25	6.6	23	7.1
1,500.....	142.3	133.0	27	.4	25	3.0	172.1	158.5	32	8.3	30	1.3
1,600.....	156.1	145.6	34	.9	31	9.4	188.4	173.6	41	1.7	37	10.7
1,700.....	167.7	158.7	41	9.1	39	6.0	202.0	189.1	50	3.6	47	1.0
1,800.....	177.4	170.8	50	.6	48	2.2	213.8	204.0	60	3.6	57	6.5
1,900.....	187.5	180.7	59	6.9	57	5.2	225.9	216.1	71	9.2	68	8.0
2,000.....	196.6	190.7	70	.6	67	10.8	238.5	228.0	84	11.6	81	2.8
2,100.....	208.8	200.9	83	1.2	79	11.6	251.6	240.3	100	1.7	95	7.3
2,200.....	220.0	216.3	97	5.0	95	9.0	265.1	252.9	117	4.6	111	11.4
2,300.....	231.5	222.4	113	6.5	109	0.8	279.0	265.9	136	9.8	130	4.7
2,400.....	243.3	233.5	131	8.4	126	4.9	293.3	279.2	158	9.1	151	1.3
2,500.....	256.0	245.0	153	1.2	146	6.1	307.8	292.8	184	1.8	175	1.0
2,600.....	268.0	256.6	174	1.1	167	6.0	323.1	306.7	210	10.0	200	2.2
2,700.....	279.9	267.7	199	8.5	190	11.9	337.5	319.9	240	9.2	228	2.6
2,800.....	293.2	280.0	228	0.1	217	9.4	353.5	334.6	274	11.1	260	2.4
2,900.....	306.7	292.6	259	7.2	247	7.3	369.9	349.6	312	4.4	295	10.3
3,000.....	320.7	305.5	294	10.2	280	1.1	386.9	364.9	357	1.1	335	6.8

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PRINCIPAL DIMENSIONS AND WEIGHTS OF U. S. MAGAZINE RIFLE, MODEL OF 1903.

DIMENSIONS.

	Inches.
Barrel:	
Diameter of bore	0.30
Exterior diameter at muzzle	0.619
Exterior diameter at breech	1.14
Length of chamber and bore	23.79
Length of travel of bullet in bore	21.697
Diameter of chamber, rear end	0.4716
Diameter of chamber, front end	0.442
Diameter of neck of chamber, rear end	0.3425
Diameter of neck of chamber, front end	0.3405
Length of body of chamber	1.793
Length of shoulder of chamber	0.16
Length of neck of chamber	0.396
Length of chamber, total	2.3716
Rifling:	
Number of grooves, 4.	
Twist, uniform, one turn in	10.00
Width of grooves	0.1767
Width of lands	0.0589
Depth of grooves	0.004
Height of front sight above axis of bore	1.05
Distance from top of front sight to rear side of leaf, leaf raised	22.1254
Stock:	
Length, with butt plate	40.166
Crook, i. e., distance from axis of bore to heel of butt	2.089
Distance from trigger to butt plate	12.74
Length of gun complete	43.212
Sight radius	22.1254
Width of single division on windage scale	0.0267

WEIGHTS.

	Pounds.
Barrel	2.79
Barrel, with rear sight base and front sight stud	3
Butt plate	0.26
Receiver	0.98
Bolt mechanism	1
Magazine and trigger guard	0.44
Magazine mechanism, including floor plate	0.17
Bayonet	1
Stock	1.58
Hand guard	0.13
Front and rear bands, including swivels	0.25
Rear sight, not including base	0.20
Total weight of metal parts	7.30
Oiler and thong case	.19
Total weight of arm, including oiler and thong case, with bayonet	9.69
Total weight of arm, including oiler and thong case, without bayonet	8.69
Weight to compress mainspring	16 to 18
Trigger pull (measured at middle point of bow of trigger)	3 to 4½

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MISCELLANEOUS DATA.

Initial velocity	2,700 feet per second.
Powder pressure in chamber	about 49,000 pounds per square inch.
Weight of ball cartridge	about 392 grains.
Weight of bullet	150 grains.
Weight of powder charge	about 50 grains.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
Washington, February 14, 1908.

March 3, 1904.
Revised April 18, 1906.
Revised February 14, 1908.
FORM No. 1923.
Ed. Feb. 14-08—50,000.
38543-16-7.

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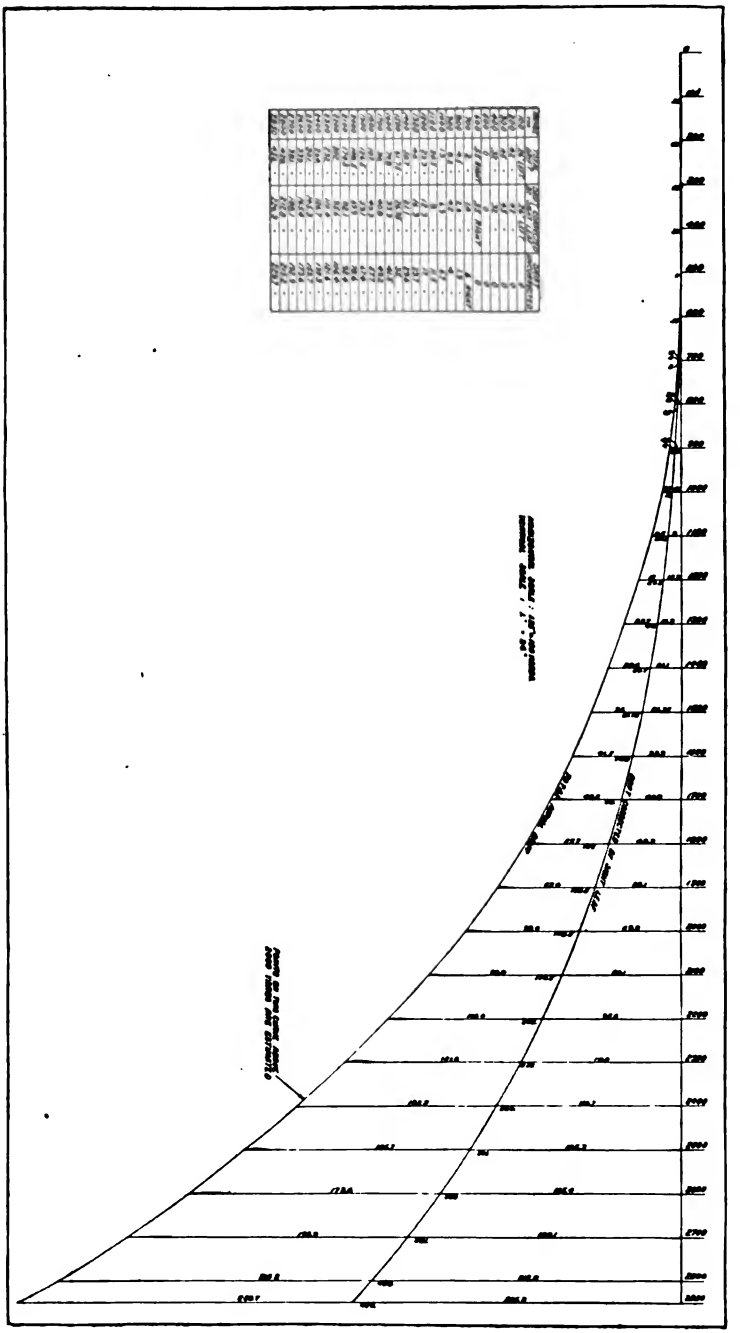
PLATE I.



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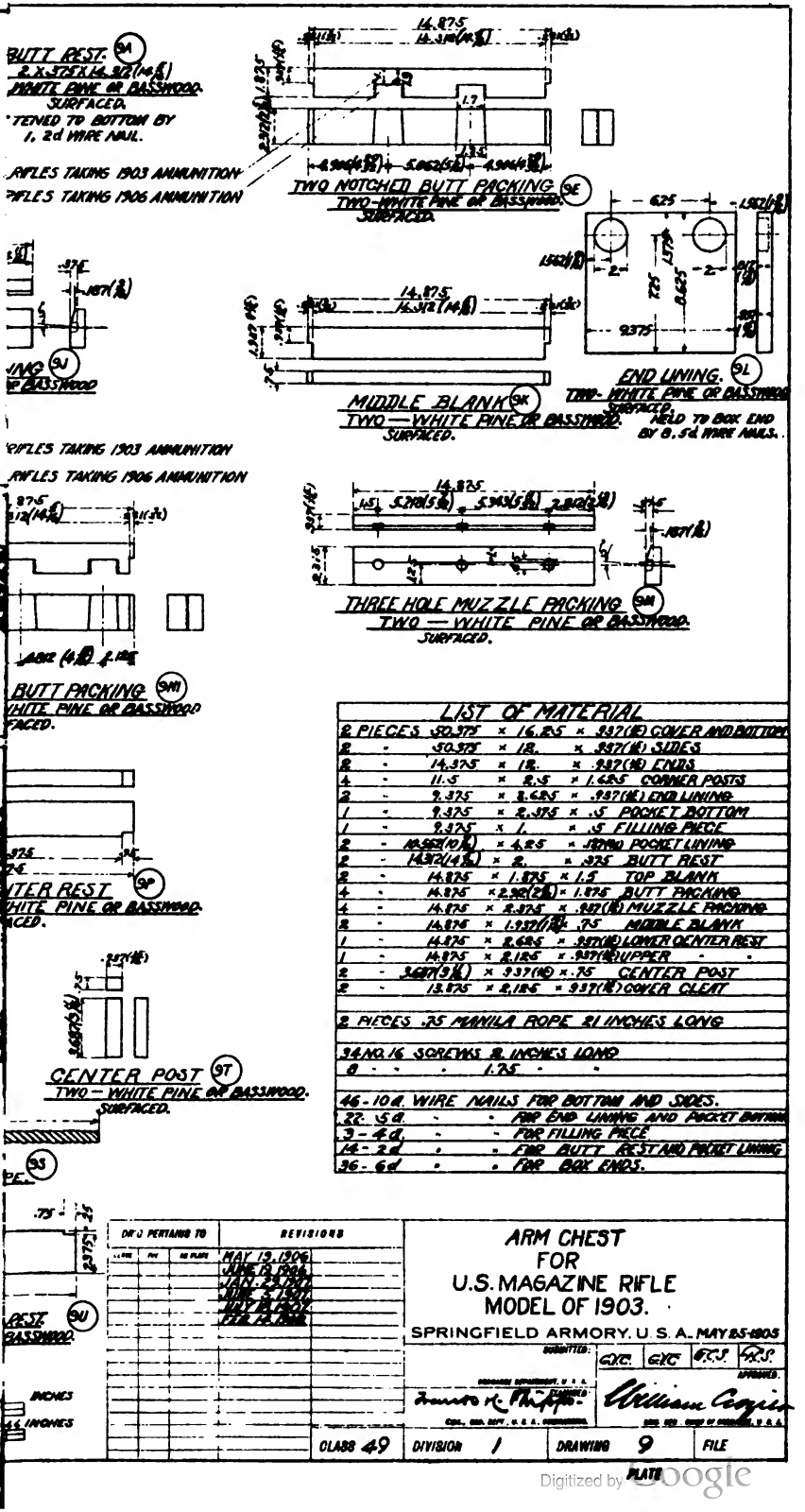

LIST OF MATERIAL

2 PIECES	50.375	× 16.25	× .937(15/16)	COVER AND BOTTOM
2 "	50.375	× 12.	× .937(15/16)	SIDES
2 "	14.375	× 12.	× .937(15/16)	ENDS
4 "	11.5	× 2.5	× 1.625	CORNER POSTS
2 "	9.375	× 8.625	× .937(15/16)	END LINING
1 "	9.375	× 2.375	× .5	POCKET BOTTOM
1 "	9.375	× 1.	× .5	FILLING PIECE
2 "	10.562(10 5/8)	× 4.25	× .187(3/16)	POCKET LINING
2 "	14.312(14 5/8)	× 2.	× .375	BUTT REST
2 "	14.875	× 1.875	× 1.5	TOP BLANK
4 "	14.875	× 2.312(2 5/8)	× 1.875	BUTT PACKING
4 "	14.875	× 2.375	× .937(15/16)	MUZZLE PACKING
2 "	14.875	× 1.937(1 15/16)	× .75	MIDDLE BLANK
1 "	14.875	× 2.625	× .937(15/16)	LOWER CENTER REST
1 "	14.875	× 2.125	× .937(15/16)	UPPER " "
2 "	3.687(3 5/8)	× .937(15/16)	× .75	CENTER POST
2 "	13.875	× 2.125	× .937(15/16)	COVER CLEAT
2 PIECES .75 MANILA ROPE 21 INCHES LONG				
34 NO. 16 SCREWS 2 INCHES LONG				
8 " " " 1.75 " "				
46 - 10 d. WIRE NAILS FOR BOTTOM AND SIDES.				
22 - 5 d. " " FOR END LINING AND POCKET BOTTOM				
3 - 4 d. " " FOR FILLING PIECE				
14 - 2 d. " " FOR BUTT REST AND POCKET LINING				
36 - 6 d. " " FOR BOX ENDS.				

DR'G PERTAINS TO			REVISIONS
LEAVE	PAY	NO PLATE	MAY 19, 1906
			JUNE 19, 1906
			JAN. 29, 1907
			JUNE 5, 1907
			JULY 18, 1907
			FEB 14, 1908

ARM CHEST FOR U.S. MAGAZINE RIFLE MODEL OF 1903.

SPRINGFIELD ARMORY, U. S. A. MAY 25-1905

SUBMITTED: G.V.C. G.V.C. F.C.S. F.C.S.

APPROVED:

Frank K. Phillips — CIVIL, ENG. DEPT., U. S. A., ENGINEERING.

William Crozier — ENG. DEPT., CHIEF OF ORDNANCE, U. S. A.

CLASS 49 | DIVISION 1 | DRAWING 9 | FILE

PLATE

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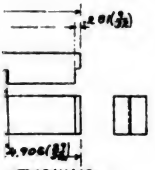
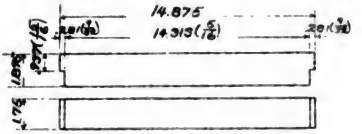
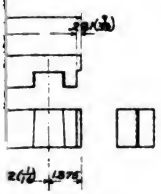


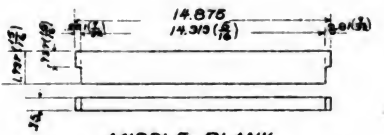
PACKING.
PINE.



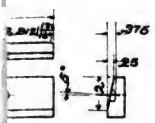
TOP BLANK.
TWO - WHITE PINE.



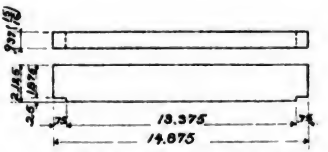
PACKING.
PINE.



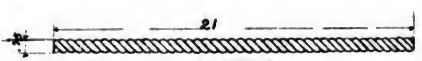
MIDDLE BLANK.
TWO - WHITE PINE.



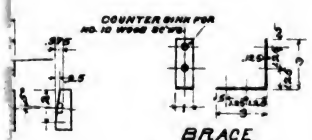
LE PACKING.



UPPER CENTER REST.
ONE - WHITE PINE.



HANDLE.
TWO - MANILA ROPE



BRACE
FOUR - STEEL

NG.

DR'G PERTAINS TO			REVISIONS	
CLASS	DIV.	AS PLATE		

ARM LOCKER
FOR
U.S. MAGAZINE RIFLE
MODEL OF 1903.
SPRINGFIELD ARMORY, U. S. A., JUNE 13 1906

SUBMITTED: Wilford Stewart, LIEUT. ORDNANCE DEPARTMENT, U. S. A.
EXAMINED: Frank R. Phipps, COLONEL, ORD. DEPT., U. S. A. COMMANDING.
AG | AG | G.C.A. | G.C.R.
APPROVED: William Crozier, BRIG. GEN., CHIEF OF ORDNANCE, U. S. A.

CLASS 49 | DIVISION 1 | DRAWING 10 | FILE

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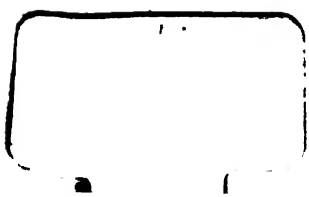

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